IRON AGE

Vol. 161, No. 7 February 12, 1948

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Bad Judgment

THE classic example of bad judgment is provided by a Negro pugilist named Battling Siki who agreed to fight a fellow named Mike McTigue in Dublin on St. Patrick's Day. Siki lost.

The President of the United States is contesting the honor with the swarthy Senegalese. On a day when wheat fell the full limit of ten cents on the Chicago grain exchange, followed by another day with similar weakness accompanied by sharp declines in corn, oats and pork, he demanded the enactment of drastic curbs. The failure to grant him these extraordinary powers, said the President, would mean a continued spiral of inflation, an inevitable crash and a painful depression.

Mr. Truman is the wrong man to issue this challenge. He is the head of a party which is now rounding out 16 years in power. During that period it abandoned the gold standard, raised the price of gold, repudiated its gold obligations, incurred chronic budgetary deficits, depressed the money rate—all for the deliberate purpose of raising prices. Since V-J Day the present Administration has used the great influence of its top personnel and exceptional research facilities to encourage and rationalize wage increases. It has spent hundreds of millions of dollars in supporting the market for some twenty farm commodities whenever any of them showed signs of weakness. The object—undisguised and frank—to keep prices up. Finally, this same government embarked on a vast program of food buying for European aid whose effects on prices were so certain and obvious that several thousand of its own retainers, including members of the President's household, jumped on the speculative band wagon. It was a sure thing.

If the President now deplores inflation, his face must be red.

This is the wrong time to demand controls. Natural forces may well be curing an ailment aggravated by unsound federal policy and inept execution. From the Secretary of Agriculture comes the statement that government grain requirements for European account out of the current crop year have been approximately satisfied. The total carryover of all grains is better than it was a year ago. Burma has harvested a record rice crop. Australia offers the story of a wheat crop approximately a third greater than the prewar average. Moisture conditions in Europe have been excellent, with forecasts of a grain harvest up 500 million bushels from last year and within 15 per cent of prewar levels. Winter conditions on the North American continent promise another heavy grain crop. Mounting supplies may overcome the ineptitude of official mass buying and the contradictions of a price policy rushing vigorously in two opposite directions at the same time.

Washington is the wrong place to demand totalitarian controls. It was only last October—before the President reinstated a group of ham economic advisers, New Deal alumni—that he characterized price controls as attributes of a police state. We think the American people will hold the President right in October and wrong in February.

If Battling Siki mistook the issue and erred on time and place, so has Harry Truman.

Joseph Stagg Lawrence

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► Ram jet engines being tested at the N.A.C.A. laboratory in Cleveland produced such a terrific noise that regular sound level meters, used for determining the intensity of a noise, could not be used, as they were not calibrated for so great a noise. Silencers of classic design also had to be replaced by specially constructed units.

► Administrative costs of the War Assets Administration are on the increase. They rose to 49 pct of realization during the final quarter of 1947, as compared with the 26 pct average for the year.

► As a result of the extensive emphasis that Germany placed on powder metallurgy during the war this industry will probably be one of the first to regain its wartime position. This is particularly true at present in Austria.

► Side blown bessemer converters are being enthusiastically praised by the investigators who are testing small vessels in this country. Chief advantages are: Hotter steel can be made in the side blown converter than can be made in a bottom blown converter with iron of the same silicon content, the side blown vessels seem to produce cleaner steel and the steel doesn't pick up as much nitrogen as does steel made in the bottom blown converter.

► Steel-minded Congressmen are disturbed over the unconcern shown by the Senate Banking Committee toward Senator Martin's bill to pry loose government scrap. However, pressure from steel consumers may force the bill to the Senate floor for passage in short order.

► Carbon molybdenum steel of about 0.80 carbon is being actively investigated as a substitute for ordinary bearing races in which 52100 steel was formerly used. Should chromium again become short certain manufacturers are getting set to have available a satisfactory grade of steel fully developed and tested.

► When British shipbuilders asked how they were to get 20 pct more production with 20 pct less steel in 1948, they were told that their 1948 allocations were greater than those of 1947, that they had been fortunate in receiving deliveries in excess of allocations last year. Government, meanwhile, continues to press them to take more orders for ships.

► The first synchrotron core structure built by a midwestern firm is a 300 million volt unit and was shipped to Massachusetts Institute of Technology, to be placed in operation this year. Other synchrotron structures are being built for the universities of Purdue, Michigan and Cornell.

► Although no one knows for sure, it's a good guess that the current slump in the commodity market and the sympathetic reaction in the stock market will have no effect on steel demand and output. Nor will it be of any importance to heavy durable goods activity. Plant and equipment are wearing out faster than they are being replaced. Steel inventories are not larger than they should be in relation to demand. Maybe at some later date the affinity will come, but not now.

► One effort being made to combat the lumber shortage in this country is the cutting down of the amount of lumber used in export packing. Export companies say that the consignees sometimes welcome the lumber just as much as the goods packed in it.

► The original schedule of reparations from Japan's iron and steel industry may be revised as Germany's was. There is a growing feeling against pouring U. S. money into Japan to supply things she could make herself. The Russian position in China is not being overlooked either.

► Insurance on truck shipments of steel sheets has become almost useless to steel companies. In several recent cases steel mills waived claim to losses in truck accidents. They fear letting the insurance firms salvage the damaged sheets, lest they find their way into gray market channels.

► Letters from indignant exporters are piling up on Congressional desks in Washington. The two main complaints of the traders are: (1) Placing of all exports under control, (2) Lowest price criterial in issuance of export licenses. Another objection is that small producers are being frozen out of export trade by the new regulations.

Plaster Molds

o o o

By HERBERT CHASE

o o o

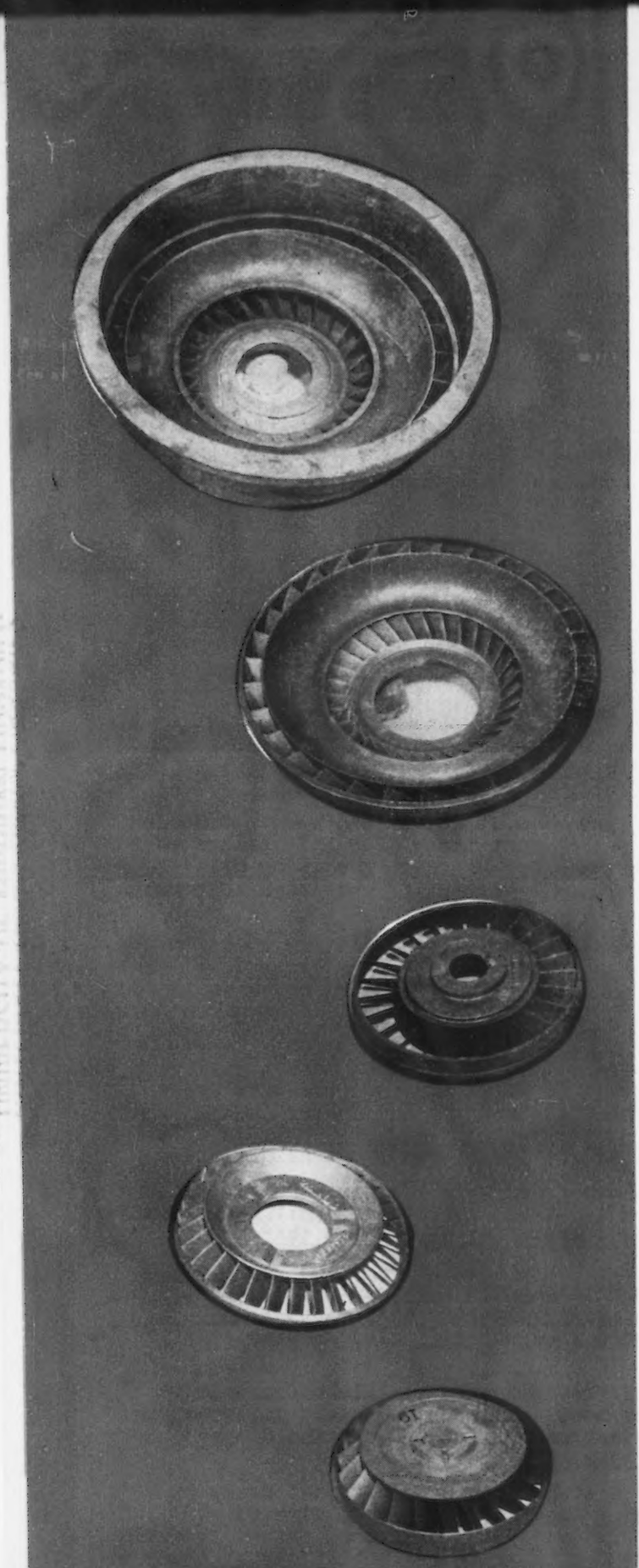

FIG. 1—A set of five aluminum castings for the Buick torque converter, produced in the Allison-Bedford foundry by the Antioch plaster mold process. All blades are cast in. The rough weight of these five castings is 15 lb.

NO engineer familiar with metalworking practices, including those employed in casting, can fail to be impressed by the production accomplishment represented by the aluminum castings shown in fig. 1 that constitute major elements of the torque converter in Buick's new Dynaflow Drive.[1] In fact, some of the top production engineers of the General Motors Corp., assigned to devise the best way of making these rather complex parts, found the problems somewhat appalling until the Allison Bedford Foundry, Bedford, Ind., came up with the answer.

All of the elements in the torque converter involve a series of curved passages between pairs of side walls. Fig. 2, a radiograph of the turbine element, shows the form and relative positions of these passages. Vanes between the passages not only must be curved but must vary in thickness from comparatively sharp edges at inlet and outlet ends to maximum thickness at intermediate points. Shapes of the passages are such that metal cores are not feasible and the dimensional limits imposed at points where machining must be avoided are so close that production at moderate cost imposes very difficult problems.

Those engineers who favored fabrication from stamped or forged steel elements not only found tooling costs extremely high but were faced with assembly problems not easy of solution. Although some method of casting each of the major components as a one-piece structure would sidestep the assembly problem, castings had to be complex and held within as-cast dimensional limits so close (see figs. 3 and 4) that no ordinary foundry would undertake the job. So-called precision casting (lost wax process) would be expensive, even if applicable, and appeared unlikely to hold the dimensional limits considered essential.

The Allison-Bedford foundry, however, definitely is not an ordinary foundry. Its war experience in casting aluminum cylinder heads

for Casting Intricate Aluminum Torque Converter Parts

An unusual combination of plaster sections and dry sand and plaster sections is used to produce the aluminum castings required for the Buick torque converter. This new molding technique, described for the first time in this article, permits the production of very intricate castings with high physicals and with as-cast tolerances as fine as ±0.010 in. This article gives a step-by-step description of the production of these castings and also covers a number of very interesting sidelights of the process, including the use of plastic core boxes.

for Allison and Packard engines had yielded sand castings of highest grade, and postwar experience had led to making other gravity poured castings to even closer limits. Some of these later castings were made by the patented Antioch plaster mold method,[2] and this experience made the Allison foundry technicians confident of their ability to cast the converter parts well within the drawing and specification limits imposed, at the same time securing sound castings that have exceptionally good physical properties.

To do the job on a production scale required considerable development work that is still continuing, but samples produced in the early development stages were so high in quality and so well within dimensional limits that it was decided to proceed with production. Not the

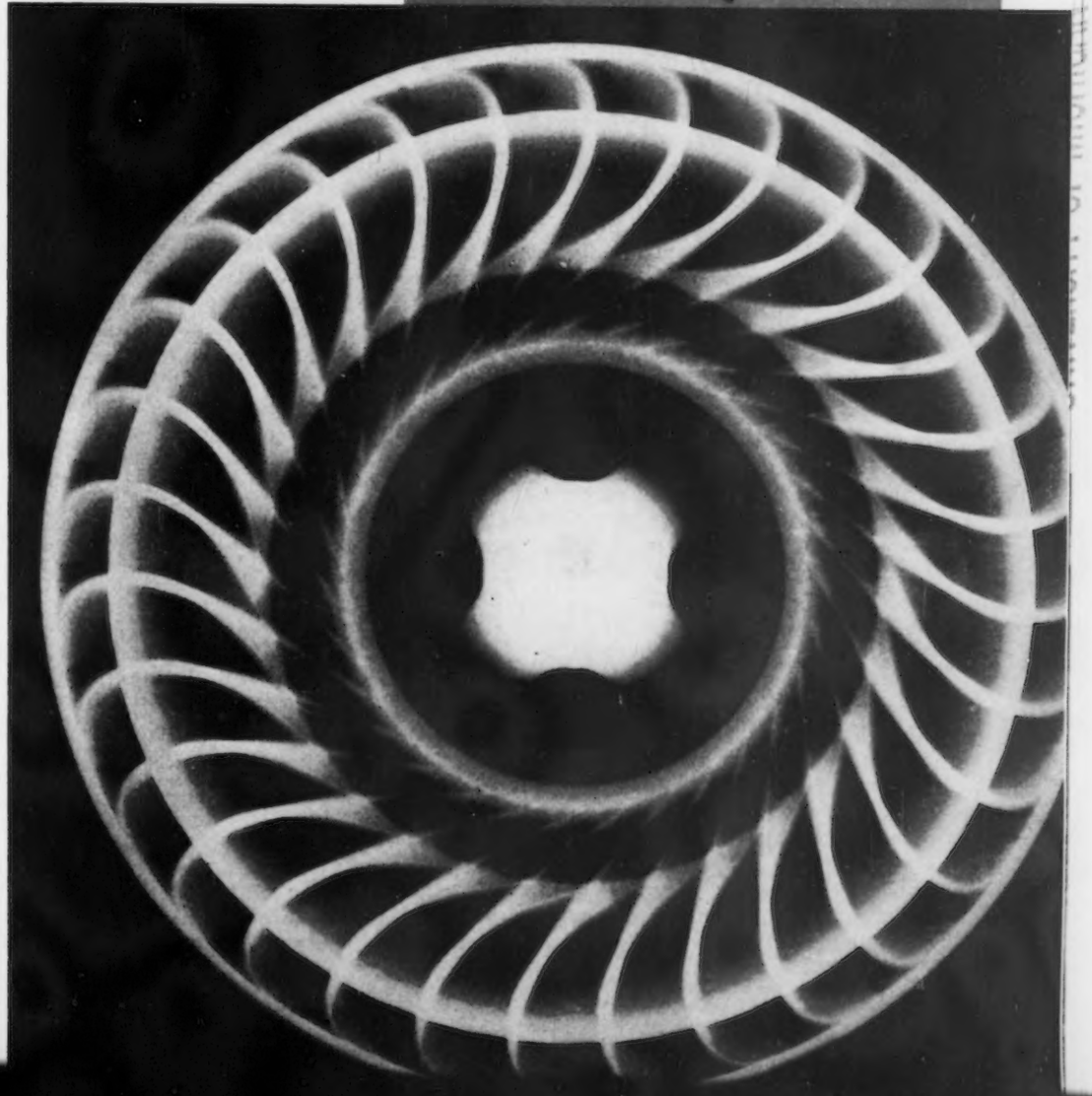

FIG. 2 — Radiograph of a turbine element of a Buick torque converter, illustrating the complex passages that must be cast in and held to close as-cast tolerances. The freedom from porosity is also noteworthy.

least of the considerations involved is that tooling costs are less than a tenth of those for other methods investigated and the casting method offers flexibility not attainable economically with fabrication from wrought metals.

Moreover, the castings, shown in fig. 1, are strong and remarkably free from porosity. As-cast surfaces closely approach those attainable in aluminum diecasting, and dimensional accuracy is nearly as close or perhaps even closer on some dimensions than is attained in diecastings of comparable size. There is also less flash than on diecastings and it is possible, as cores are used only once and are disintegrated after the casting solidifies, to make shapes not feasible in one-piece die castings.

Even a casual inspection of the radiograph, fig. 2, substantiates the last mentioned point and also gives evidence of the soundness of the castings produced. The drawing of the turbine converter, fig. 3, and of the primary pump converter, fig. 4, show *as-cast* dimensions held with limits only 0.020 in. apart even on some dimensions exceeding 11½-in. Actually, even closer limits are being held. Vanes have an angular spacing within ±2° and the tolerance on vane angles is ±1°. Vanes come close to having sharp edges, as the radius at the edge is 1/64-in. maximum. The vane section tapers from 1/32-in. thickness, increasing gradually to 0.075 in. on some elements and 0.090 in. on others.

These dimensions give some idea as to the remarkable limits held in casting. The close dimensions are made possible by the high precision of the Antioch molds and cores. These molds differ greatly from ordinary plaster molds, not only in composition and method of preparation but also in their effect upon the castings themselves.

In the Antioch process, a part of the water of crystallization remains in the plaster, but the plaster is so treated that a permeable structure is formed. When the casting is poured, at least a part of the water of crystallization is converted into steam which is free to escape through the permeable mold walls, much as in sand casting. Latent heat, absorbed in forming the steam, produces rapid chilling of the casting and results both in a fine grain structure and in superior physical properties.

Aside from making the molds proper, it is necessary to do an exceptional job of core work. An average converter casting has about 30 passages, each formed by a separate core. To hold the specified dimensions and spacing, avoid flash and assemble the cores in the mold, circumferential spacing is of greatest importance. Only 0.001 in. space is allowed between cores at their roots where they nest to form a practically continuous annulus, hence core boxes of extreme precision are required. It is necessary, in fact, to hold critical dimensions of these boxes within quarter-thousandth limits, or far closer than most makers of core boxes are accustomed to work.

One of the difficult problems, in fact, has been to develop a method of making core boxes economically within such close limits. An answer has been found, however, by casting split boxes from a thermosetting resin that does not change dimensions when it solidifies and is said to possess exceptional dimensional stability. The boxes are cast inside a metal form and around a master metal pattern which itself has to be an extreme precision product.

Except for such refinement cores would either make a loose fit in the mold or if slightly oversize would be so tight a fit that the requisite number would not nest in the annular space provided, especially since, with thirty cores to place, even a small deviation from limits in each core is multiplied thirty fold in the assembly.

Even the methods of production control at the Bedford foundry are unorthodox. An experimental department works out the necessary technique in minutest detail and incorporates these details in a written procedure that must be followed in production. To insure that it is followed, technically trained men, skilled in laboratory work, are given active control of every phase of production and take into the shop whatever is needed in the way of instruments to check methods and product and see that specifications are met. If deviations are found, these men have authority to suspend the operation until the deviation is corrected.

In short, by making the foundry obedient to exacting and truly scientific control and tying its operations directly to laboratory supervision, the foundry finds that it can do a precision job more or less comparable with that of a toolroom and attain results heretofore regarded as impractical in foundry practice.

Both the production of molds and cores and the making and finishing of castings has reached a stage where it has been adapted to a continuous conveyorized production setup. This setup will continue to be altered as more efficient procedures now being investigated or tried are developed and equipment can be changed to put these methods into effect. Study of the methods described here indicate, however, that development has already gone a long way and is producing some truly amazing results.

Production starts with the preparation of a dry mix consisting of gypsum, sand, an inhibitor that prevents chemical reaction between the gypsum and metal cast and an accelerator or regulator that controls the rate at which the mix sets. All ingredients are weighed out and, after thorough commingling, are supplied to a wet mixer where water in metered amount is added and thoroughly mingled with the dry mix to form a slurry of cream-like consistency.

This wet mixer, fig. 5, is supported from a monorail so that it can be moved back and forth between two pallet conveyors each of which

[1] *A description of the new Buick automatic transmission was given in* THE IRON AGE, *Jan.* 15, 1948, *p.* 74.

[2] *See "Precision Aluminum Castings,"* THE IRON AGE, *Apr.* 9, 1942, *p.* 50.

forms a continuous loop around which the pallets move at a fixed rate. Flexible hose hanging from the mixer is so arranged that the slurry can be discharged either into molds or into a hand container from which core boxes are filled, molds being on one conveyor and core boxes on the other.

Molds referred to here are for casting plaster copes and drags which, after the plaster sets and is treated, as later described, are assembled

Some upper halves are made in three parts hinged together (see fig. 6) and are arranged to unwrap from the cast, as this is necessary to clear the cast after it has solidified.

Each portion of the mold is so shaped that the surfaces which come in contact with the plaster slurry when the mold is filled shape the corresponding part of the cast being made. One or both mold halves include fixed portions that act as cores in the sense that they produce

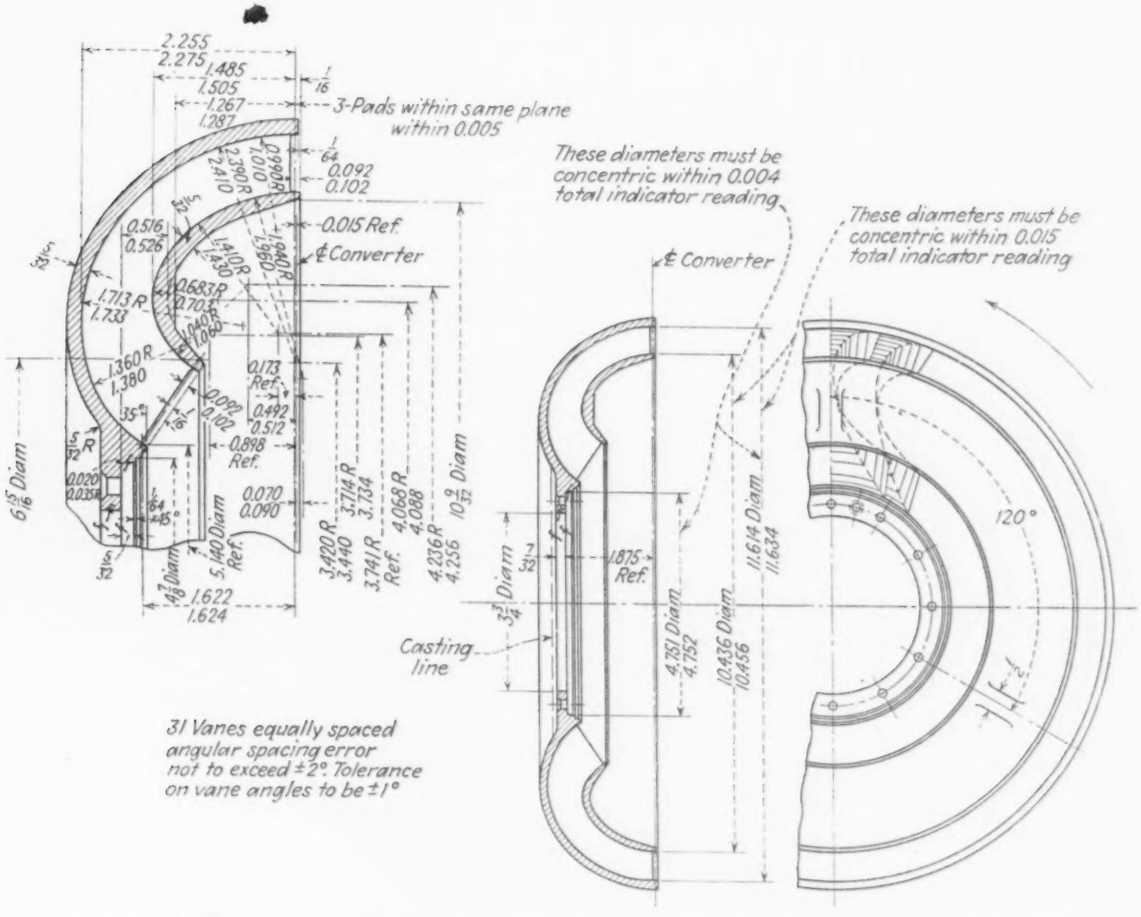

FIG. 3—Turbine element of the converter, showing the close as-cast dimensional limits the foundry must meet.

to form molds in which the aluminum alloy is cast. Similarly, the core boxes produce cast cores which, when solidified, are removed from the boxes and are placed on trays hanging from an overhead chain that parallels portions of the two pallet conveyors. The chain carries the cores to benches where the cores are assembled into the plaster drags.

Molds in which copes and drags are cast are aluminum and consist of two major parts that are machined with high precision and are made extremely smooth where they come in contact with plaster. The lower section of each mold rests on the pallet and the upper section, placed on top of the lower one, is open at the top to permit filling with slurry.

recesses or holes in the cast. One such recess made in the cast for each drag is shaped to receive the plaster cores later assembled in the drag. After the molds are filled to overflowing and the plaster is partly set, the excess is scraped off flush with the top of the mold.

Speed of the pallet conveyors is so adjusted that by the time the molds reach given stations they are ready to be opened and the plaster casts, then sufficiently set or hardened, are removed. The parts of the molds are laid on the conveyor, are blown clean with air and then are sprayed (see fig. 6) with mold release material before reaching stations where the mold is reassembled ready for refilling with slurry. Casts removed from the mold are shifted onto

trays hanging from the chain conveyor and are taken off the assembly benches where the casts are built up into molds, including core insertion. Assembly is a meticulous job of finger work performed by girls who become highly skilled in making the assembly. In so doing, they use a knife to trim any sharp edges from cores and reject any of the latter having imperfections. At this stage both mold and cores, though solid enough to handle, are moist and not very strong, necessitating careful handling.

Core boxes on the second pallet conveyor are filled from a hand receptacle having a conical bottom and a thumb-operated valve, as this is convenient for filling the small core cavities, which are open on top. Each core box has several duplicate cavities and is split in such a way that the cores can be removed, the halves making a very close fit and being held together by a plate in which there is a hole that makes a close fit with the outside of the box holder. The boxes themselves are of plastic but the plastic block is held in a metal frame machined with high precision.

After core boxes are filled, they progress around the conveyor and, at one station, the excess of slurry that overflows each cavity is shaved off flush with the top surface. By the time the core boxes reach the unloading station, the plaster has set and the locking frame

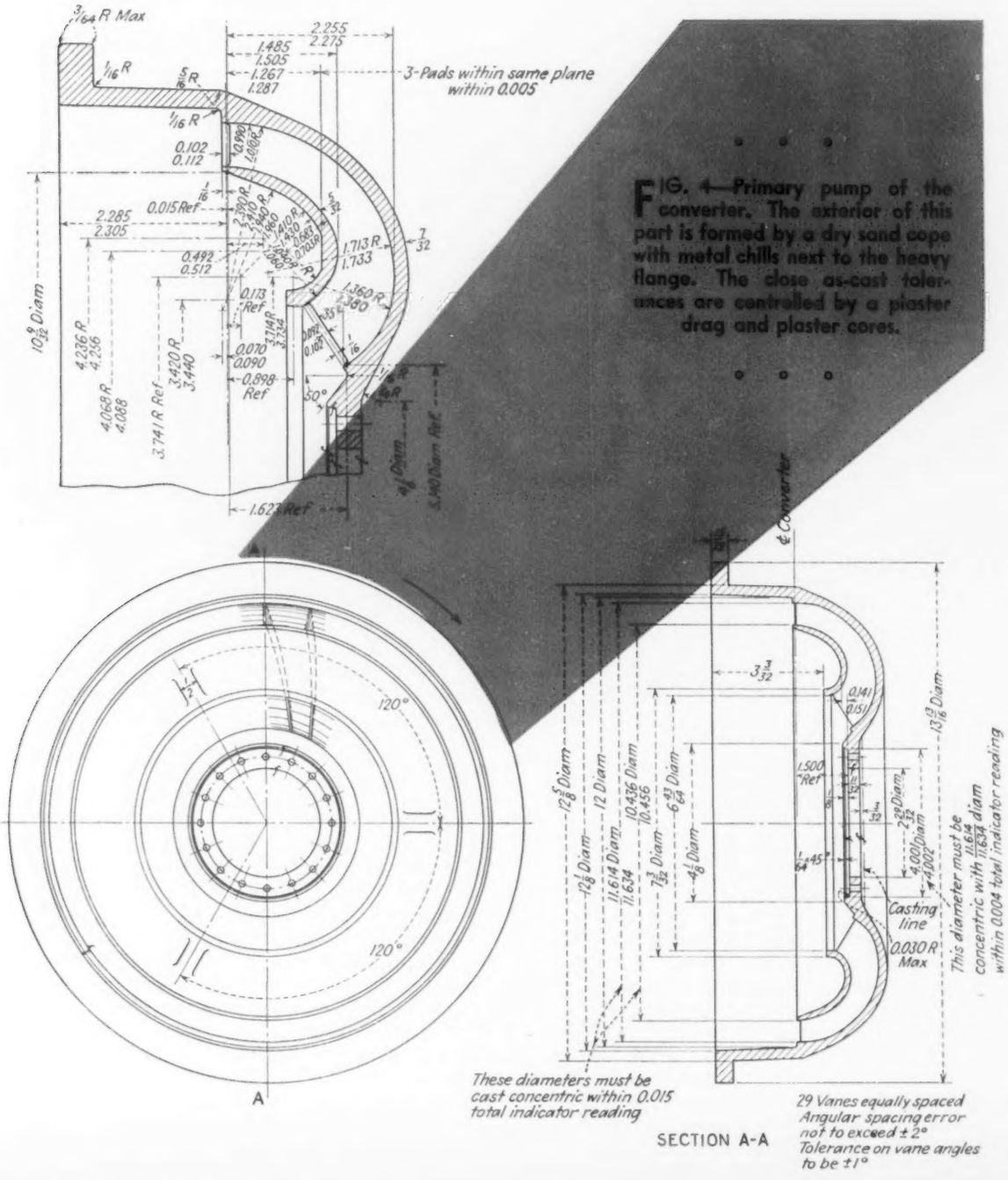

FIG. 4—Primary pump of the converter. The exterior of this part is formed by a dry sand cope with metal chills next to the heavy flange. The close as-cast tolerances are controlled by a plaster drag and plaster cores.

around each box is removed. A girl then directs an air jet at the parting and this causes the box to open and the cores to be freed without injury. Boxes are then fully opened, the cores are removed manually and are laid on trays of the chain conveyor.

At the next station interior surfaces of the box are blown clean and are sprayed with mold release, after which they are locked again for refilling. All operations on the core conveyor are light and are rapidly performed by girls.

All drags for molds in which aluminum converter parts are to be cast are made from plaster as are all copes except those that form certain surfaces of the turbine and the primary pump. Of these particular surfaces, one is outside the converter assembly and, as there is no need in either case for extreme precision or for exceptionally smooth surfaces, dry sand copes are applied. These copes, made in another department doing such work exclusively, cost less than plaster copes and, as they meet other requirements, are used for economy. Chills are applied in the dry sand cope where it forms the flange of the pump converter (fig. 4) because this is the heaviest section of the casting and is subjected to high stresses.

After plaster parts of molds are completed and assembled, they are sprayed with kerosene and are placed in racks where they remain at room temperature for 6 to 8 hr during which the plaster sets harder. Kerosene is applied to prevent too rapid air drying while setting proceeds. Then racks, with castings still in them, are shifted by fork trucks into an autoclave, shown in fig. 7. When the latter is filled and its door is lowered and locked, steam at 17 psi is admitted and is held at this pressure for eight hours. Racks of molds are then removed and the molds cured in air at room temperature for 12 hr. At the end of this period, racks are shifted into oven dryers and are baked for 20 hr at 350°F.

The net result of this 48-hr curing cycle is to remove all free moisture and to reduce but not eliminate the water of crystallization. It is this partial reduction in the water of crystallization that makes the plaster permeable. As already explained, this steam produces a chilling action that is highly desirable but is absent in conventional plaster molds.

When gypsum is put into the dry mix, it contains one molecule of water. Addition of water in producing the slurry changes the content to two molecules of water. After curing, however, only one molecule of water remains. The molecules of water referred to here are those of crystallization, not free moisture, all of the latter being driven off during the curing cycle. When the latter is completed, the molds are allowed to cool to room temperature and are set on a pallet conveyor to be poured.

Preparation of metal for pouring is a most important step in the production of mold castings of high grade. Although secondary aluminum is used, it is first subjected to careful refining.

FIG. 5—Filling a mold with the plaster mix. Core boxes, to be filled with same mix, are carried by the conveyor to the rear of the operator.

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FIG. 6—Spraying a cope mold with mold release after removing the plaster mold. The upper section of the mold (shown in the foreground) is constructed in three pieces, hinged together to facilitate removal from the plaster cast.

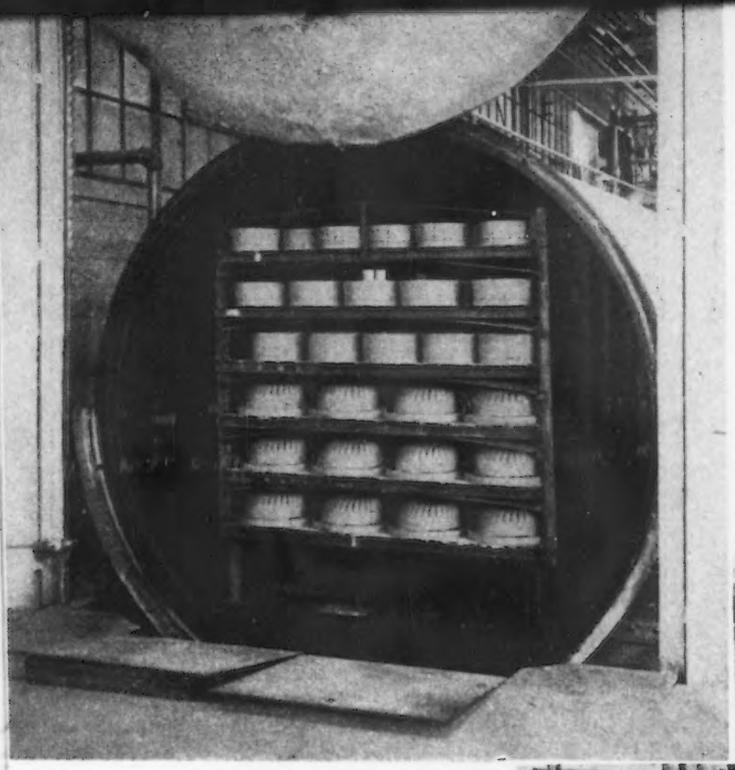

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FIG. 7—Autoclave loaded with plaster molds for the first step in the plaster curing process.

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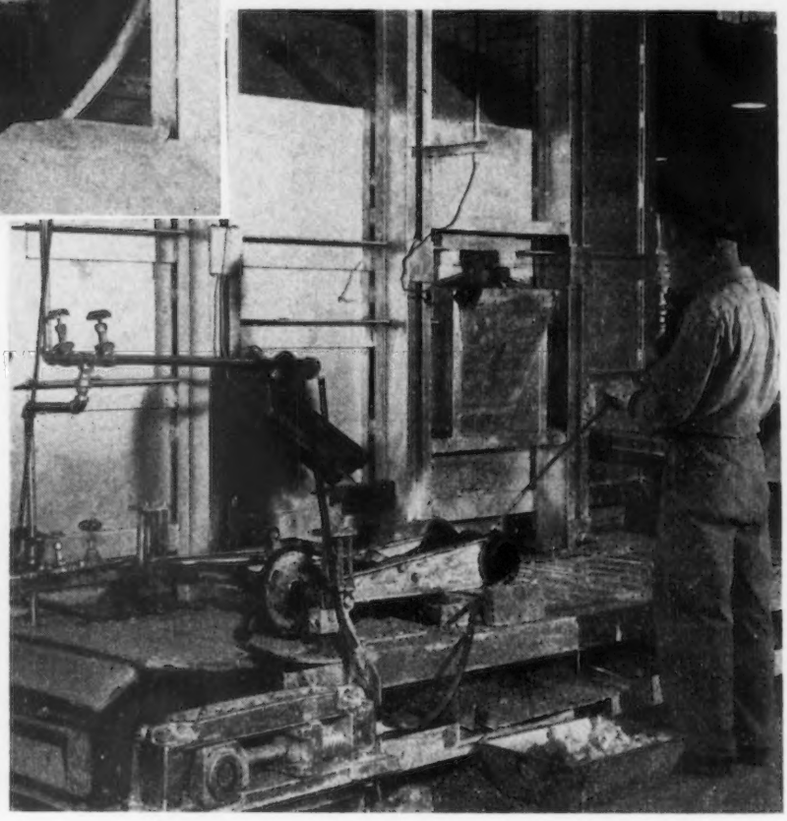

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FIG. 8—Pouring aluminum alloys from the openhearth into pigs. The molten metal is discharged through a rotating spout that stops the flow momentarily as the joints between the continuously moving ingot molds pass under the spout.

Metal is purchased in ingots, already refined, to specifications. The first step in further refining, however, is done in the plant in gas fired open hearth furnaces (fig. 8) of Allison's own design. To the ingots are added a proportion of gates, sprues, risers and rejects from the plant.

Melting is done at low temperature under a flux to minimize oxidation and simmering is continued long enough for heavy impurities to settle out and some hydrogen to be driven off. Screening is done to remove any particles of refractories not melted as the metal is run off into ingot on a conveyor as shown in fig. 8.

Discharge into ingot molds is controlled automatically by a rotating spout which interrupts the flow as joints between ingot molds (which move continuously) pass under the spout. After the metal solidifies, the ingots drop out into tote boxes as the molds are inverted and start back on the conveyor for refilling. Ingots of metal thus refined are transferred to a row of gas fired furnaces, fig. 9, next to the conveyor carrying the plaster molds that are ready for pouring.

Crucibles at these furnaces hold 600 lb and, after each batch of 400 lb of new metal is melted, it is allowed to stand while dry nitrogen, supplied through a pipe and manifold from bottles, is allowed to bubble through the molten metal. This treatment effects a further reduction in hydrogen content and is the final step in preparing the metal for casting.

Reduction of hydrogen has much to do with the production of sound castings and the elimination of channel porosity. Although the metal does not conform to high purity specifications for aluminum aircraft castings, it is said to yield equally good physical properties.

Gas supply to the furnace is adjusted to hold the metal slightly above the pouring temperature of 1400°F. Each furnace supplies three melts per eight-hour shift.

Hand ladles are filled by tilting the furnace, but before pouring the temperature of metal in each ladle is checked. All pouring is by gravity, and is done as the molds, on conveyor pallets, move slowly past. Because of the chill produced by the formation of steam generated in molds, cooling is rapid. The molds are self-supporting and do not require cope or drag boxes.

When molds, continuing on the conveyor, arrive at a conventional shakeout, they are ready to be broken up and, being comparatively light, are shifted onto the shakeout by hand. Conveyor pallets are then reloaded from mold racks spotted near the point where the pallets approach the pouring stations.

From the shakeout, castings are passed to a band saw where sprues are cut off and castings are placed on a belt conveyor, fig. 10. There, any excess flash at points that are not to be machined is broken off. There is remarkably little such flash, often none at all, and what there is is so thin that it is very easily broken away.

From initial inspection, made when flash is removed, castings go to Vapor Blasting, which is done with 100-lb air pressure and wet grit

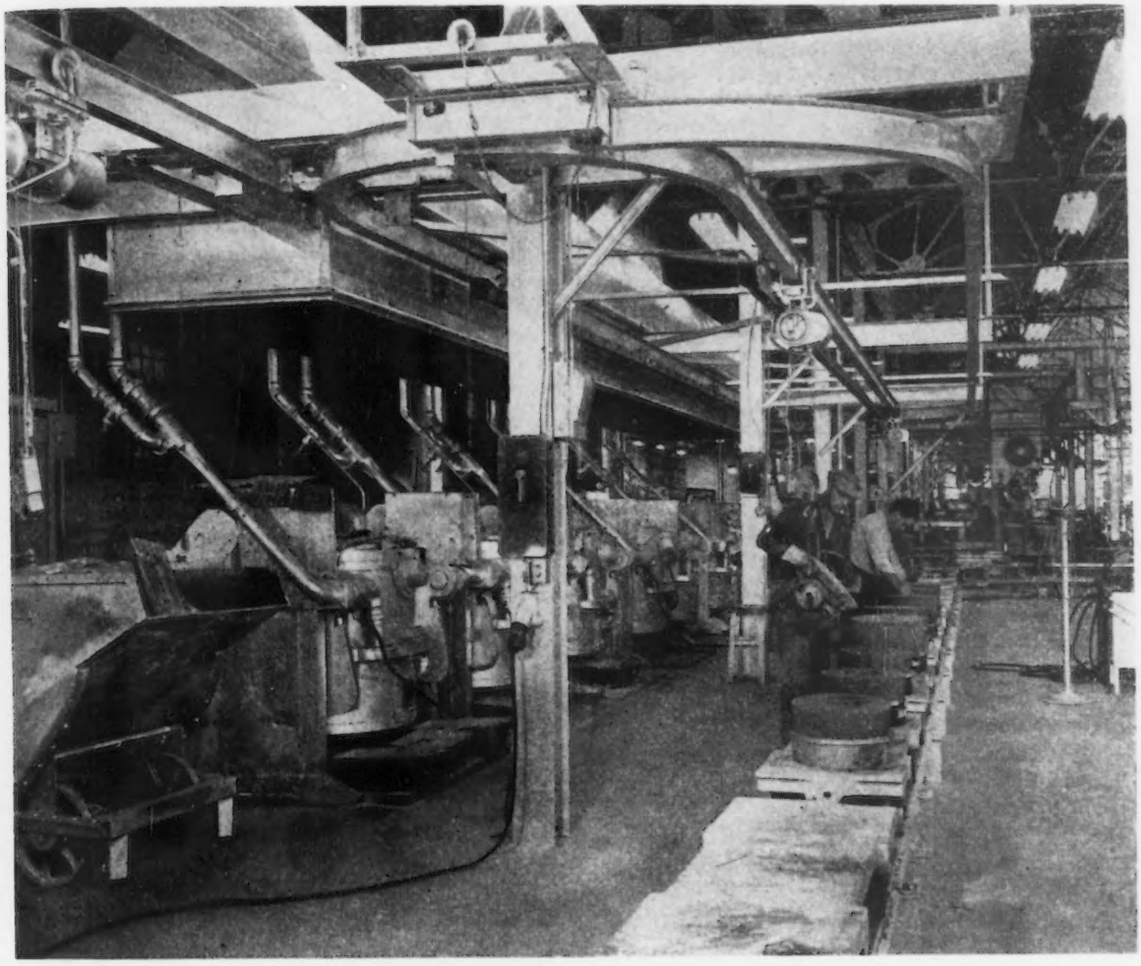

FIG. 9—Mold conveyers passing the pouring station. Furnaces are to the left. Molds visible in the foreground have plaster drags and dry sand copes.

RIGHT

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FIG. 10—Inspecting converter castings as they move past on a conveyer. A Vapor-Blast unit, at the left, is used to remove plaster particles, especially from the cored passages.

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of 100-mesh grade. This blasting clears away all plaster not removed in the shakeout, especially any that may remain in the cored passages. Blasting results in a very clean casting having a uniform matte appearance. Surfaces produced in contact with plaster are unusually smooth and even parting lines are not prominent.

After blasting, the castings receive final inspection, including gaging, and only a small percentage is rejected, despite the close dimensional limits specified. Although drawings permit ±0.010-in. variation on most critical dimensions, ±0.008 in. is commonly attained and ±0.005 in. is not unusual. Some eccentricity limits are reported held within ±0.002 in.

From inspection, castings are packed in steel baskets which are lowered into heat-treating furnaces, heated to 960°F and held at this temperature for 6 hr. Basket loads are then quenched in water, which must be boiling, and then are aged for 5 hr at 500°F.

As the flanged pump element that bolts to the flywheel of the Buick engine is subjected to heavy internal pressures in service, freedom from leaks is important. In consequence, all these castings are clamped in a test fixture, are sprayed outside with a soap solution and then subjected to 100 psi internal pressure. If any leaks occur, they are detected by bubbles on the soap film. Out of many thousand castings made up to the time data for this article were collected it is stated that only two leakers were found.

Although all of the castings, of which there are five per set, undergo some machining after delivery to the Buick plant, cuts are light because of the close dimensions held. Machining is chiefly where mating with other parts is required or unusually close clearances are necessary.

There is no machining on blade surfaces, as the cored passages are given their correct contours and adequate smoothness by the plaster cores. As each casting is a self-contained unit having all blades integrally cast, no separate blades or assembly of these is required. It is largely on this account and that of much lower tooling costs that castings have crowded out fabricated steel assemblies.

Statiflux Method For Nondestructive Inspection of Nonconductors

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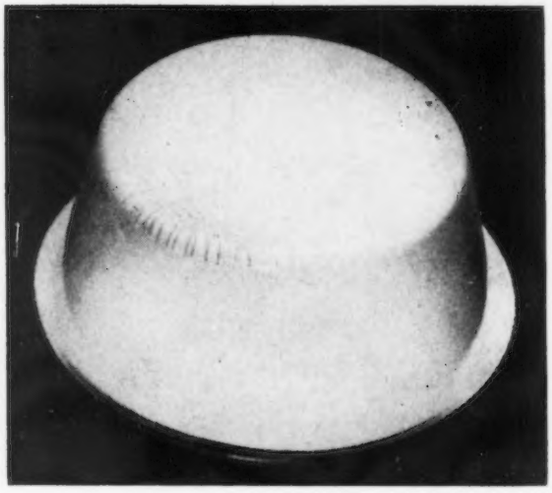
CERAMIC products such as glass, porcelain enamel, plastics and other nonporous materials of low conductivity can now be inspected to locate cracks and pores no matter how fine the defect may be. This rapid and nondestructive inspection uses electrified particle inspection methods. Invisible defects which usually precede spalling, chipping or age cracking can be reliably located on products such as enamel stoves, sinks, refrigerator liners, bottles and quality glass products. Elimination of wasteful scrap and expensive replacement can be precluded with this quality control or 100 pct inspection of product.

Three simple steps are all that are involved in the electrified particle inspection with Statiflux, an inspection procedure developed by the Magnaflux Corp. First the surface is coated with a liquid penetrant, the surface is then dried, and



STATIFLUX indications of quenching cracks in bottom of triple enameled test pan.

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then a fine cloud of electrostatically charged inorganic particles is blown onto the nonconducting surface to be inspected. The powder particles are held electrostatically at the defect, to make a highly visible indication marking the defect readily apparent, as shown in the accompanying illustration. Defects so found are far below visible size, and most of them cannot be seen with the microscope, dyes or more tedious inspection means.

Low Temperature Treatment of Steel

By H. E. BOYER
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The effects produced by low temperature treatment upon heat-treated steels are closely associated with the effect of cold treatment on austenite transformation. Following this line of thought, the author has conducted an intensive study concerned essentially with high carbon steels, but including some medium carbon and carburizing grades. The results of this investigation are disclosed in this article, together with recommendations that can be applied to advantage in everyday practice. In this first part of a three-part article, the author employs TTT curves as a means of associating transformation characteristics of five different types of high carbon steels with basic fundamentals of heat treating.

DURING the past 3 or 4 years there has probably been no other subject relative to heat treating that has been the topic of as much discussion as that of employing low temperature treatment to obtain certain physical properties in heat-treated steels. Although it was used in Germany some 15 years ago and in this country for at least the past 10 or 12 years, the use of cold treatment for practical applications in manufacturing plants was extremely limited for two main reasons; (1) lack of suitable equipment to obtain adequate low temperatures, and (2) a complete lack of basic knowledge regarding the effects of low temperature upon transformation.

It should be stated that this article does not in any way deal with the use of low temperatures as a method of obtaining temporary thermal contraction to facilitate such operations as shrink fitting. That is another subject and has no relation to permanent transformation as affected by the use of low temperatures.

To the best of the author's knowledge the lowest temperature used for any practical application in an effort to obtain permanent transformation was, prior to World War II, about —20°F. Cold treatment was employed by relatively few manufacturers and results were, in nearly all cases, questionable. Various new demands created by the development and manufacture of weapons for war helped to bring about an increase in the development of mechanical refrigeration equipment. When equipment capable of being operated continually at low temperatures, requiring little maintenance, began to appear, the process of cold treating steels was received with renewed interest.

The mechanical refrigerator, which operated at temperatures of —50 to —60°F, was probably the first to be used to any great extent in manufacturing plants. At the time this type of refrigerator was in use to the greatest extent a survey of results claimed by different users was quite varied. Some results claimed were actually amazing while others could be termed only as amusing, at least by technical people who had some understanding of the changes involved in the heat treatment of steel. The refrigerators that operated in the range of —50°F rapidly gave way to newer machines which could be used for practical applications at still lower temperatures. First it was —75° and then —90° and finally —120°F. The equipment that developed the temperature of approximately —120°F has been very popular for use in manufacturing plants, as well as in re-

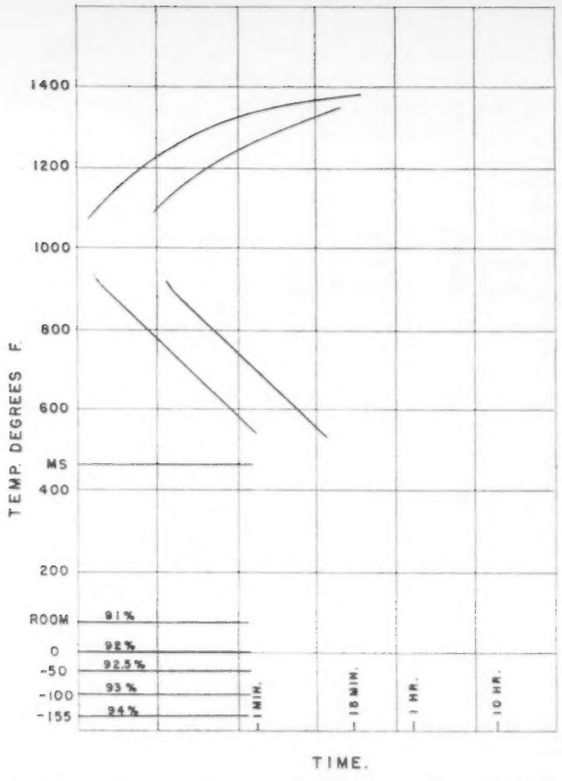

FIG. 1—Curves showing approximate time and temperature transformation characteristics for type A steel.

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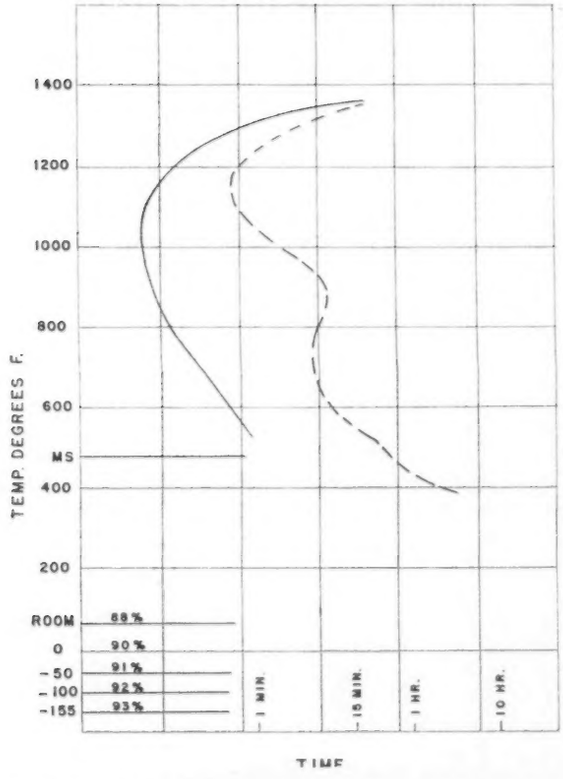

FIG. 2—Curves showing approximate time and temperature transformation characteristics for type B steel.

search and development laboratories. Probably the main reason why this machine held the spotlight longer than the others was due to the fact that it was only recently that any equipment suitable for everyday use was developed with which still lower temperatures could be obtained.

Since it has been the general opinion that the lowest temperature possible to obtain was most desirable, the —120°F machines became extremely popular. More recent developments have now made available refrigeration equipment which can be operated continually at temperatures of —150°F, or slightly lower. It is the author's understanding that there is equipment now in process of development which can be operated in the range of —200°F. There has been a great deal of research work done by numerous investigators using temperatures of —250°F, or lower, for cold treating steel specimens.

Since up to the present time there has not been suitable equipment available which can be consistently operated at temperatures lower than —155°F, the results published herein are entirely confined to those obtained by using this temperature as minimum. In other words, it is felt that since this article is intended primarily to answer some of the everyday questions and to point out the advantages and limitations of low temperature treatment, there is little to be gained in the discussion of phases which cannot yet be applied to industrial work.

In general, low temperature treatment is still one which is a subject of much discussion and whether or not any benefits can be derived remains a question in the minds of many. Probably the main reason that the process is questioned is due to the fact that, like many other processes, it has been oversold, and attempts have been made to apply it where there was no possibility of any benefit being obtained. There is now becoming available more accurate data regarding the advantages and limitations of subzero treatment, so that the prospective user can determine whether or not he can be benefited by such a process.

Some of the questions most frequently asked regarding low temperature treatment are listed in table I.

There are probably other questions regarding the process which have remained unanswered, but it seems that this list incorporates the more common ones. In the following text an attempt is made by the author to answer, as accurately as possible, the above list of questions and to give further information regarding the practical use of low temperature treatment. The reader can then judge for himself whether or not there is any chance that low temperature treatment can be of any benefit for his particular application.

While information contained in the following text has been obtained from a careful study of a number of different steels, the greatest amount of attention has been devoted to five different types of high carbon steels. The compositions of these five steels are given in table II. Results obtained by using low temperature

treatment on several other types of steels are discussed later, but the five steels shown in table II are discussed first, and separately, for two reasons; (1) tool steels of higher carbon content represent the class which has been most discussed in reference to low temperature treatment, and (2) it is less difficult to obtain accurate test data on the higher carbon types than some other steels, particularly the carburizing grades.

These five steels which have been studied most intently are shown in table II as types A, B, C, D and E, respectively. Hereafter, in this article, they will be referred to by this letter designation. It will be noticed that they are all of the tool steel type: Type A is an ordinary straight 1 pct C type of tool steel; type B is actually a tool steel type though due to its heavy demand in the bearing and other industries it is also listed as an engineering steel and marketed as SAE 52100; type C will be recognized as the regular 18-4-1 type of high-speed steel; type D is a common type of high-carbon, high-chrome tool steel which finds its principal use in the manufacture of high quality dies; and type E is the 1 pct C martensitic type of stainless steel commonly known as type 440C.

The basic fundamentals of heat treating steels can be most easily explained by TTT curves (Time, Temperature, Transformation curves). Starting with type A steel, which is a simple straight-carbon type, the approximate TTT curve is shown in fig. 1. When a steel of this composition is heated to a temperature of about 1450°F, the carbide dissolves in the matrix forming austenite. Of course, if all carbides were to be dissolved, an extremely long period of time would be required. In fact, complete carbide solution would probably be impossible if there was no increase in temperature. An increase in temperature, hereafter referred to as austenitizing temperature (temperature at which austenite is formed), causes carbide solution to proceed rapidly, becoming virtually complete at 1750° or 1800°F, in a very short time. It is not, however, usually desirable in practice to obtain 100 pct carbide solution or even anywhere near such a percentage. It is more common practice to dissolve only about 60 to 70 pct of the carbide, and since this can be accomplished in a relatively short period of time at 1450°F, this temperature has become the most common for steels corresponding to type A.

The structure at the austenitizing temperature is composed of austenite and undissolved carbide. When the steel is cooled from this temperature, the undissolved carbide remains unaltered, but the austenite undergoes a major change, since it is generally unstable at temperatures lower than about 1350°F. Any structure formed under 1350°F will be in the alpha phase, but whether this new structure is pearlite, bainite or martensite, or a mixture of these structures, is dependent entirely upon the manner and rate in which the cooling takes place. The curve at the left of fig. 1 shows how the austenite starts to decompose as a function of time, while the curve to the right represents the completion of transformation at the various temperatures. The break in the curves in the range of 1000°F represents a portion of the range in which it is extremely difficult to obtain accurate data regarding the rate of transformation.

In order to harden this type of steel it is necessary to employ an extremely rapid quench so as to cool through the 1000°F range almost instantly. If this cooling is accomplished with sufficient rapidity, the formation of pearlite will be entirely suppressed and the austenite will begin to decompose at lower temperatures forming other types of structures. It may be observed that if this steel is rapidly quenched to the range of 500° to 600°F, the time required for transformation to begin is appreciably lengthened. The structure resulting from quenching the austenitic structure to 500° to 600°F and allowing transformation to reach completion in this range, is known as bainite.

TABLE I

How to Obtain Optimum Results from Low Temperature Treatment

Some operating questions raised most frequently regarding the use of low temperature treatment are listed as follows:

(1) What happens to heat-treated steel parts when they are subjected to subzero temperatures?
(2) Why is it desirable to transform all austenite possible?
(3) How much austenite can be transformed by the use of low temperature treatment?
(4) How is hardness, and other physical properties, affected?
(5) What types of steels are most responsive to low temperature treatment?
(6) Are all heat-treated steels affected?
(7) Does low temperature treatment affect steels which are in the annealed state?
(8) Should parts be tempered before or after the low temperature treatment?
(9) How low is it necessary to cool parts in order to obtain maximum transformation?
(10) Is it detrimental to allow parts to remain at room temperature for long periods of time, after quenching, before subjecting them to the low temperature?
(11) How long should parts remain at the low temperature in order to obtain maximum benefit?
(12) Is it necessary to employ more than one cycle of cold treatment in the sequence of operations?
(13) Is there a great danger of cracking in parts subjected to the extremely low temperatures?
(14) Which is the more satisfactory cooling medium, air or liquid?

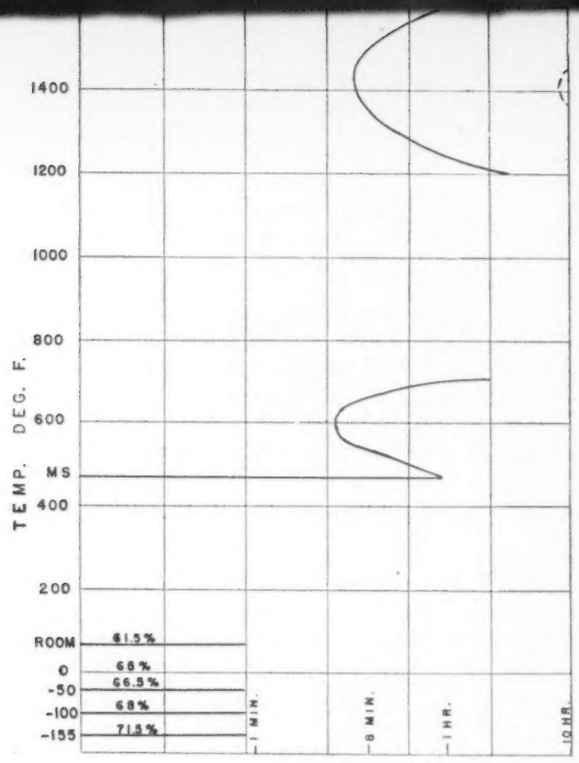

FIG. 3—Curves showing approximate time and temperature transformation characteristics for type C steel.

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Bainite is a relatively hard (about RC 55) and very tough structure.

It is usually desirable, in the heat treatment of this steel, to form a structure composed principally of martensite. Martensite is formed by the austenite decomposing at relatively low temperatures and is the hardest of all structures. The temperature at which martensite begins to form in this type of steel, when austenitized at 1450°F, is approximately 475°F. The change from austenite to martensite at this temperature is not abrupt, but merely represents the temperature at which the undercooled austenite begins to slowly transform. As cooling proceeds down to room temperature, the formation of martensite takes place with increasing rapidity. The rate of cooling from the M_s temperature to room temperature is not extremely critical, since martensite is the only structure that will form from austenite at this relatively low temperature.

The line marked "Room" in fig. 1 shows that 91 pct of the volume has transformed. The remaining 9 pct is retained austenite, which is somewhat reluctant to transform. It must be remembered, that while fig. 1 does show a temperature called the M_s point (start of martensite), it does not show any M_f point (temperature at which formation of martensite is completed). Investigators have had little difficulty in finding the M_s temperature with a relatively high degree of accuracy, but the location of the M_f temperature presents a far more difficult problem. In fact, various authors have indicated M_f temperatures for certain types of steels, but although these temperatures may be regarded as sufficiently accurate for most practical purposes, it is doubtful whether any investigator has been able to find the true M_f temperature. Other investigators have proven that there is some transformation of austenite effected even at temperatures as low as —250°F, or even lower, in some of the very high alloy steels.

It is known definitely that austenitizing time and temperature (temperature particularly) do influence the location of the martensite formation range to a marked degree. As the percent of carbide dissolved in the austenite increases—whether such condition is gained by time or temperature—the M_s point is lowered, which in turn lowers the temperature of the M_f point. In all probability the martensite forming range is appreciably lengthened as well as depressed. The entire pattern of the TTT curve for a steel of a particular composition is altered with varying degrees of carbide solution. The time for pearlite to begin to form, as well as other beginning transformation times, is appreciably increased as the carbide solution is increased. The increase in carbide solution affects a growth of the austenitic grain, which brings about the condition just described. In other words, while one TTT curve

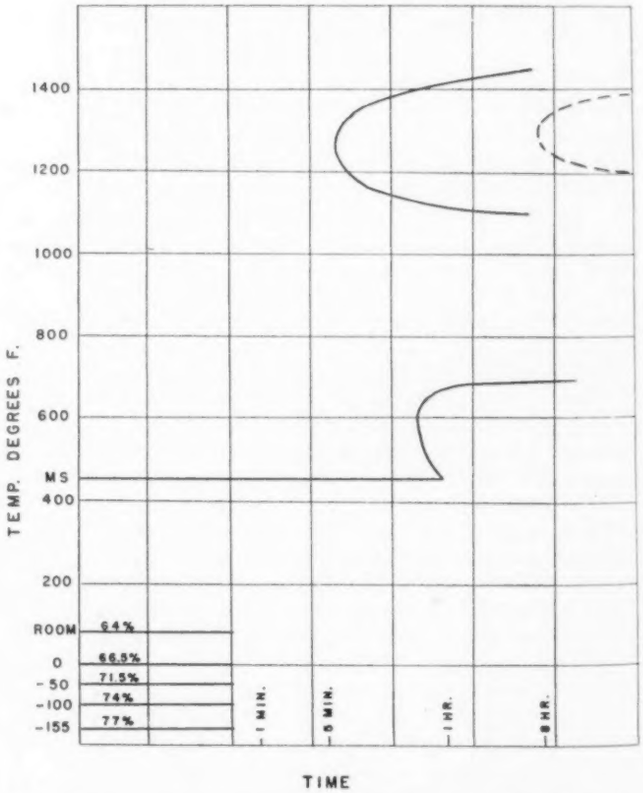

FIG. 4—Curves showing approximate time and temperature transformation characteristics for type D steel.

serves only for steels of constant composition and grain size, whether the austenitic grain size in the steel is originally coarse or whether the grain is coarsened in the austenitizing operation, the results are about the same relative to the behavior during transformation.

It will be noticed in fig. 1 that type A steel shows a 91 pct transformation when rapidly quenched to room temperature. As the cooling proceeds on down to —155°F, a total of 94 pct transformation is shown. Since cooling to —155°F shows 6 pct austenite remaining, it is obvious that no actual M_f point has been reached. Whether or not a temperature sufficiently low to affect 100 pct transformation could be reached is questionable.

Fig. 2 shows the approximate TTT curves for type B steel, which is of the 1 pct C low alloy type. It may be observed that the chromium addition alters the TTT curve considerably when compared with fig. 1. Due to the chromium addition, a somewhat higher austenitizing temperature is necessary in order that about the same percent of carbide be dissolved in the austenite. The temperature employed for obtaining the data shown in fig. 2 was 1550°F. The M_s temperature for type B also occurs at approximately 475°F. Specimens showed an 88 pct transformation after oil quenching to room temperature and a 93 pct transformation after cooling immediately to —155°F and measuring at room temperature. Therefore, it is obvious that even the small chromium addition tends to cause a greater percent of austenite to be retained.

Fig. 3 shows the TTT curves for a type C steel, the well-known 18-4-1, high-speed steel. In the heat treatment of the higher alloy steels an entirely different set of conditions is encountered. In the first place the carbide in a steel such as 18-4-1 is principally of the complex type instead of the common Fe_3C as is found entirely in type A steel and to a great extent in type B. The complex carbide is extremely reluctant to dissolve in the austenite, so that it is necessary to employ very high austenitizing temperatures in order to affect an appreciable degree of carbide solution. Type C steel becomes austenitic at approximately 1500°F, but at this temperature practically no carbide will go into solid solution. The data for fig. 3 were obtained from specimens austenitized at 2325°F, which is probably the most commonly used austenitizing temperature for this type of steel.

It is obvious, from fig. 3, that this steel possesses a very slow critical cooling rate. When type C steel is cooled from the austenitizing temperature to the M_s point (approximately 460°F for an austenitizing temperature of 2325°F) within about 6 min, which can usually be accomplished by cooling in oil or air, the formation of pearlite and bainite will be completely avoided. Martensite starts to form as the temperature drops below 460°F and rapidly increases in the rate of formation as room temperature is reached. Fig. 3 shows that type C steel austenitized under the conditions just described has transformed 61.5 pct at room temperature, leaving a remainder of 38.5 pct retained austenite. This transformation can be increased to 71.5 pct by cooling to —155°F, showing a 10 pct transformation from the low temperature treatment prior to any tempering operations.

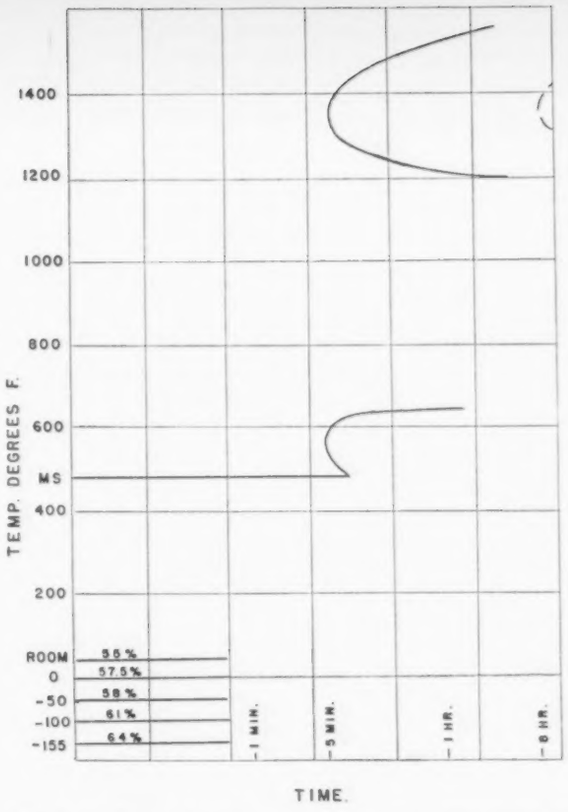

FIG. 5—Curves showing approximate time and temperature transformation characteristics for type E steel.

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Fig. 4 shows some of the transformation characteristics for a well-known type of high carbon-high chromium steel, the composition of which is shown in table II as type D. This type possesses many of the characteristics found in type C. While a rather high austenitizing temperature is necessary to affect an appreciable degree of carbide solution in type D (1800°F was the temperature employed to obtain data shown in fig. 4), it is not nearly as high as that required for 18-4-1. The formation of martensite begins at about 440°F. A transformation of 64 pct is shown at room temperature which

(CONTINUED ON PAGE 134)

TABLE II

Composition of Five Steels Studied

Type	C, Pct	Mn, Pct	Co, Pct	Mo, Pct	W, Pct	V, Pct
A	1.04	0.28	.....	.....	.....	.....
B	1.05	0.30	1.42	.....	.....	.....
C	0.72	0.32	4.10	.....	17.90	1.05
D	2.05	0.30	11.75	0.80	.....	0.20
E	1.07	0.36	17.20	0.48	.....	.....

Reclaiming Solvent Cleaners

By JOSEPH ALBIN

Petroleum solvents are renewed at 25 pct of original cost by using a compact distillation unit made from standard parts developed for dry cleaning described in this article. American Airlines engine build-up shop has added a few control refinements leading to a minimum of handling stages.

BY adapting established techniques of the dry cleaning industry for refurbishing solvents used in cleaning metal and machined parts, American Airlines at its La Guardia Field engine overhaul base has been able to reclaim these solvents at a cost of 25 pct of new material. The interesting aspect of this installation are the controls and arrangement for movement of the fluid so that the system is fairly free of operator supervision, yet yields a reclaimed product which is said by AA engineers to be equal in quality to that of new solvent.

In setting up the installation, there were questions of the improvisations needed and difficulties that might not be foreseen. Methods of transporting and disposing used solvent as a salvage or waste material were known. This knowledge was evaluated in the light of the necessity for an ever-renewable supply solvent as is the practice in dry cleaning establishments for whose use compact type stills have been developed.

The costs and output of the new installation, shown in figs. 1 and 2, operating under usual machine shop conditions were ascertained. Including all operating and overhead expenses, reclaiming amounts to one fourth the cost of new solvent. Taking 12¢ per gal as an average price of new solvent, American Airlines gets reclaimed solvent for 3¢ per gal. The setup has a capacity of 1000 barrels per year per shift. Operating a single shift last year, 550 55-gal barrels of solvent were reclaimed. In the process some losses occur, chiefly in the form of water and residues, amounting to slightly more than 10 pct.

The chief characteristic checked in the reclaimed solvent is a minimum flash point of 110° F, determined by the Cleveland open-cup test. Clarity and dryness are also essential for laboratory approval. The solvent is similar to kerosene but lighter, being a distillate of petroleum of low inflammability. It is similar

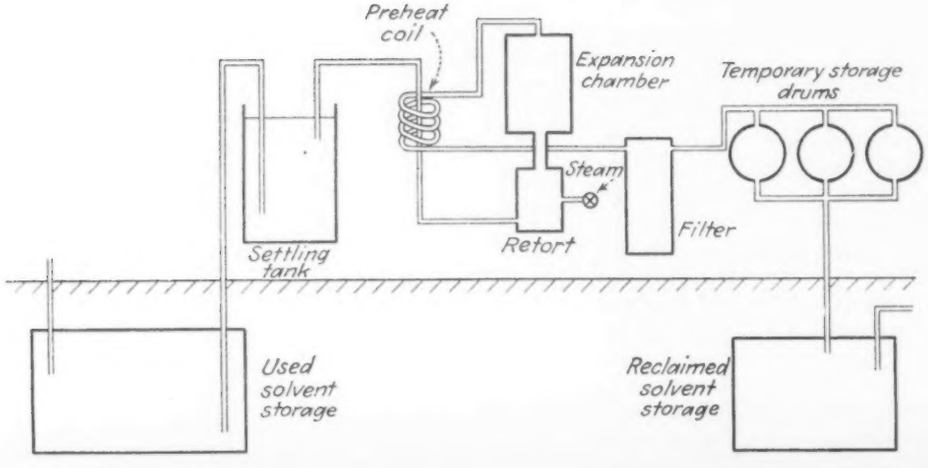

FIG. 1—This is a flow chart of major components of the reclaiming unit.

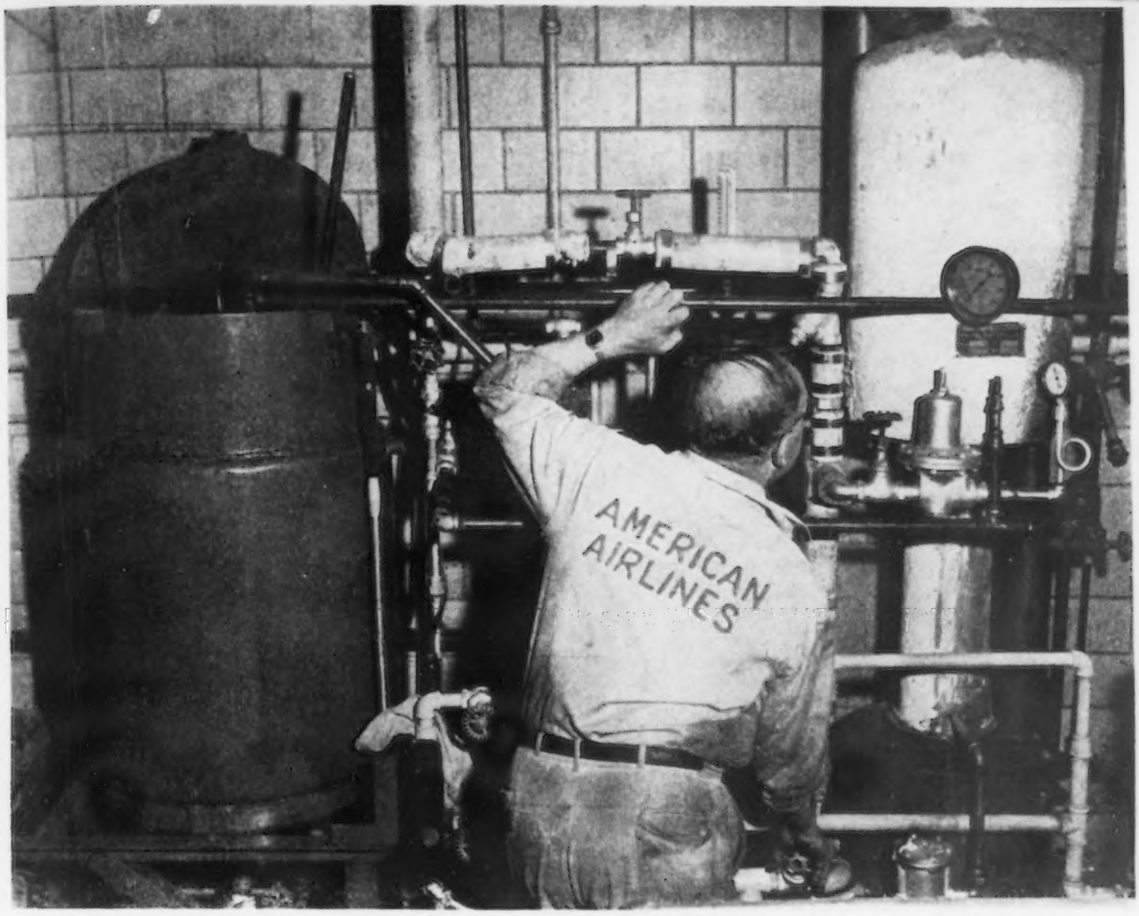

FIG. 2—Petroleum solvent reclaiming unit. The settling tank is to the left. The operator is adjusting the steam valve while watching pressure gage of expansion chamber in the back.

to Stoddard solvent, a type used in dry cleaning establishments, except that the purchased product has a flash between 115° and 120° F, while that of Stoddard solvent is 100° F.

Used solvent is accumulated in a large underground storage tank. Operating personnel has been instructed in several procedures for saving solvent after use at the various locations, such as the use of an oversize tray in which the object to be cleaned is supported on blocks. After the solvent fills the tray, the contents are run into a drum. Some cleaning jobs are done in a spray booth with air pressure as high as 80 lb. Used fluid is allowed to flow down into a receiving barrel.

Incidentally, the spray cleaning is a secondary cleaning operation that completes the job of removing occluded grime and scale from engine cylinder heads after these emerge from a chemical bath. Final cleaning and polishing is accomplished by soft grit (or seed) blasting. The spraying is economically justifiable, since it sharply minimizes contamination of the blasting particles and blasting time is considerably reduced.

Dirty solvent collected in drums and buckets from points throughout the shops is poured into the receiving pipe of the underground tank, from which it is pumped up to the reclaiming unit shown in fig. 2. A flow sheet of the installation is shown in fig. 1. The liquid going to the still is pumped from a point near the surface of the contents in the large settling tank. Water and sludge are removed from a valve opening below. Vaporized solvents rise to the expansion chamber and before reaching the condenser are used to preheat the incoming fluid. The distillate is passed through a filter to remove water and residues and is temporarily stored in three floor drums. Samples are taken from these drums for quality tests. After approval by the laboratory, the operator opens valves to allow the contents to flow by gravity into a second underground tank that stores the reclaimed solvent. From here it is pumped to dispensing valves in the hanger.

The arrangement of underground receiving the storage tanks with controls to operate the still so as to synchronize with working intervals enables the company to have on hand a supply of solvent of satisfactory characteristics. From time to time supplies of new solvent are added to make up for losses in the reclaiming process, and for spillage and evaporation. This method of solvent replenishment might also be considered from the viewpoint of inventory requirements and trucking and disposal provisions. The essential problem was to gear the functioning of certain dry cleaning equipment to the wide latitude of supply requirements encountered in airline maintenance.

The Practical

The effective utilization of metal spinning techniques can, in many cases, result in substantial production economies. This article explains the advantages and limitations of spinning, and explains where the technique can be most profitably applied. The author also covers such subjects as metals which can be spun, spinning techniques and equipment, tolerances, control of dimensions, flow of the metal, and design considerations.

° ° °

By ROBERT J. SCHNEIDER
Assistant to the President,
Gray Mfg. Co.,
Hartford

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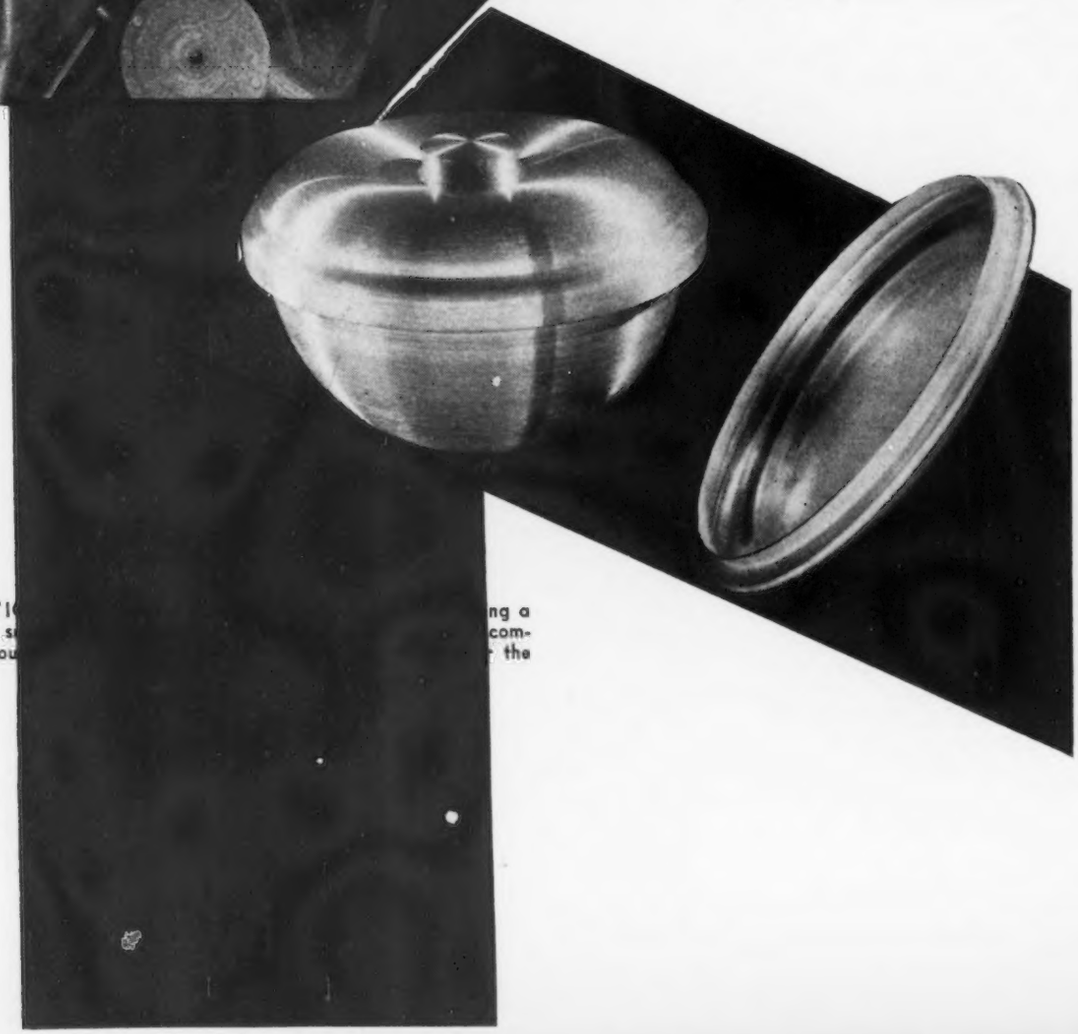

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Aspects of Metal Spin

RECOGNITION of the potential economies of metal spinning for certain production requirements is indicated by the increased utilization of this technique in recent years. Primarily responsible for this increased interest is the fact that overall production costs by spinning are often substantially below those of power press produced parts. This relationship remains true, even though in spinning labor cost is somewhat greater; the greatest production saving is in tool costs. Spinning tools may often be made at a cost of 15 pct or even 10 pct of the cost of tooling for presswork.

Further savings are likely to be enjoyed on the basis of the "time is money" axiom, for the rapidity with which a specification can be converted into a finished spinning is often one of the chief economies of the method. Only a few days are necessary to obtain tools and establish production compared to the weeks or even months generally required for press tooling.

These economies are not necessarily limited to lots of a few pieces, in which the proportional savings in tooling are obviously greater, but have been proved to apply as well to programs involving as many as 50,000 duplicate spinnings.

In spinning metal, the forces involved are such that heavily constructed lathes of special design are required. Since many spun articles are of large diameter, the bed of the lathe is often cut away to provide for the necessary swing. Some spinning lathes will swing diameters up to 6 ft or more, although diameters from 1 to 30 in. are most common.

The pressure necessary to shape the metal, to flow it and form it into the desired shape, gives rise to forces that require the spinning lathe to be equipped with unusually heavy bearings with adequate provision for end thrust. The metal spinner applies this pressure with a wooden stick or its equivalent in metal shaping tools, as shown in fig. 1. In spinning very heavy or tough metal, levers are provided for additional mechanical advantage.

Sheet stock cut to circular shape and tubing are the common forms of spinning materials and the only practical forms for use in commercial design. Tubing is recommended for economical production of very deep drawn articles, such as flasks or bullet shapes; while sheet stock is used in all other applications.

The earliest historical records of metallic spinning show the use of copper, brass, bronze, and silver and these still remain popular spinning materials. In fact, the origin of the spinning craft is in the spinning of brass and copper utensils. Red brass is the most easily spun type, being slightly preferable to yellow brass. Commercial bronze is less frequently used, preference being given to the softer tempers. Many other metals such as zinc, Monel and Inconel, Armco iron or spinning grade vitreous enameling iron, cold-rolled deep drawing carbon steel and stainless steels are common spinning materials.

Although copper and its alloys and silver were once the most common spinning materials, the soft steels and light metals have now assumed the paramount position in the field. Aluminum and magnesium have gained this position since weight saving and strength of materials are often particularly desirable properties of the types of articles produced through spinning. All evidence indicates that any ductile metal may be spun, and it is obvious that the more appreciable this characteristic, the more rapid the spinning process.

Numerous types of aluminum are suitable for spinning. Types 2SO and 3SO are among the most easily spun of all materials. They will work harden but not enough to require annealing. An interesting deep drawn spinning, from a sheet of 2SO aluminum, is shown in fig. 2. Aluminum grades 17SO, 52SO and others of similar strength are also practical spinning materials. These latter types are generally specified soft, although harder grades are entirely practical. They may require annealing between operations depending upon the amount of drawing and forming which is required. The hardness of the nonheat treatable types (2S, 3S, 52S) can be controlled by the amount of working accomplished after the last annealing operation. The heat treatable alloys (17S, 61S, 24S, 53S,

FIG. 3—Thermostat control is shown mounted by the spinning chuck of a lathe equipped to spin magnesium. The control device will assure proper flame heating application during the spinning operation.

11S) can be annealed after all forming is completed and then sized on the spinning lathe to eliminate warpage.

In general, any metal with deep drawing characteristics is ideal for spinning. Metals not having deep drawing properties may be successfully spun when properly annealed or heated while being spun. Metals which are subject to rapid work hardening will, of course, require annealing. This is especially true in spinning since essentially the spinning process is similar to a long series of drawing operations. It is for these reasons that nonheat treatable 2S aluminum is more easily worked than an aluminum-manganese alloy such as 3S or a heat treated alloy similar to 53S.

Many types of articles are spun of magnesium. Numerous such articles contributed an especially important part in weight saving of air-borne equipment during the war. Many other uses for magnesium spinnings are being developed in this postwar period.

Revere magnesium, type AN3SO, or Dow type MA or equivalents, are easiest to spin. Type AMC52S or FS-1 or equivalent are slightly more difficult to work, but the strength is greater. For most spinning purposes annealed sheet is an economical choice.

Due to different crystalline structure, design stresses in spun magnesium are very different from those of other metals. Magnesium cannot be formed to any extent at room temperature, but when heated to the proper temperature, it may be formed to a greater extent than most other metals. Spinning temperature usually approximates 600°F as the material then approaches a ductile state. The elevated temperature must be maintained consistently throughout the spinning process. For this reason, the stresses remaining in the spun product are usually minor in significance and can be neglected in consideration of the design.

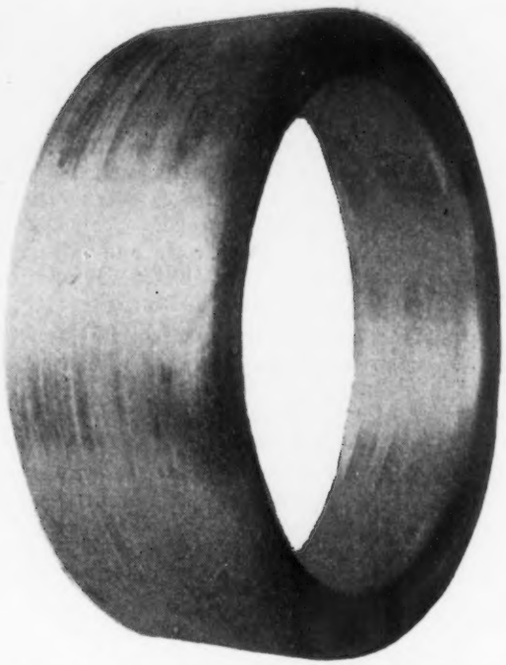

FIG. 2—A deep drawn aluminum spinning from a sheet of 2SO aluminum is shown here. It has been drawn from a blank 45.5 inches in diam to form a double wall the entire length of the ring. As shown in the finished condition it is 15.5 in. deep, 30 in. OD and 20 in. ID.

Local heating is practicable for many purposes where the spun shapes are simple and the depth of draw is moderate. In such cases, a multiple gas burner can be mounted and thermostatically controlled directly on the lathe while the material is being spun. Fig. 3 shows a Leeds & Northrup heat control device mounted by the spinning chuck of a lathe equipped to spin magnesium. This thermostatic control will assure a practically constant temperature of the worked material so that proper heating application is carried out during the spinning process. The material is worked while turning under the flame. Such an arrangement is excellent for spinning magnesium and is also desirable in all cases of rapid work hardening. In order to spin all types of metals, heat treating ovens are also essential features of a spinning department.

Spun articles may be made in any shape that is

familiarly found in the products of the potter's wheel, and if this parallel is kept in mind, a wide range of possible spun forms is suggested. Metal may be spun into concave and convex shapes or into vessels with reverse curves or it may be shaped into narrow necked vessels. It is possible, though more expensive, to spin either oval or octagonal shapes using spinning lathes with cam operated chucks especially made for the purpose. Round or rectangular beads may be incorporated and angular surfaces introduced into the product almost at will. However, it is by far more economical to maintain these changes in contour completely around the object at a given diameter or level of contour; that is, each contour line should be symmetrical with respect to all other contours in the object being spun.

The designer should bear in mind that spun articles are shaped by hand. This places some economic limitation on interchangeability at tolerances of less than ± 1/64 in. Closer tolerances can be maintained by highly skilled spinners using steel chucks and lightweights of material. A tolerance ± 1/32 in. is usually considered most economical in spinning.

Tools can be readily manipulated by the spinner for close work, but where very small savings are important, it becomes desirable to maintain about ½ in. of continuous surface between sudden contour changes. This provides ample room for even a moderately experienced spinner to manipulate his tools. By the use of trained spinners and special but inexpensive tools, contour changes can be made as close to one another as is desired. A series of embossed ridges can be readily spun completely around an object as close as 1/16 in. to one another, and as narrow as is required. Commonly used materials such as 0.040 type 2SO aluminum are most economically spun with an embossing of ¼ in. width. The sharper a change in contour, the longer the spinning time, but changes of 90° and upward are common and the differential cost is often considered of minor significance.

The limits to the radius of the change in contour or the sharpness of the angle are governed entirely by the properties of the metal. In general, corners should be slightly rounded to prevent breaking the metal. When using light stock, 0.025 or 0.032 in. thickness, this rounded edge may be so slight as to be inperceptible except to the experienced eye. The bending characteristics and required radii tables shown in the handbooks for the various metals are good guides for the designer in this respect.

The most economical spinning shape is a bowl form with inclined and flanged sides. Slight increments in cost are occasioned as the sides of the bowl approach a 90° angle with the base of the vessel. Beaded edges or embossing add somewhat to the cost, but the largest increments occur as heavier or harder stock is specified, or when narrow necked vessels are required.

Spinning may be performed in air, that is to say, by the use of only simple standard tools and no forming blocks or chucks. When using this method, the operator places a sheet of stock on a lathe and forms it with simple sticks or metal rods very much as the potter turns a cup with the use of his awl stick or a bone. Tolerances are not closely controlled in this fashion, but a few samples or interesting shapes may often be produced of light stock without an expenditure for tools.

In production runs or when size or dimension is of significance, a chuck of hard maple or of steel must first be fashioned to determine the contour of the finished article. In all but the simplest shapes, such as the common type of shallow metal lamp shade, several such chucks may prove economical. The first chucks are used for breaking down the metal and are usually made of laminated maple. The final chuck which perfects the contour and dimensions and determines the finish of the product may be made of steel.

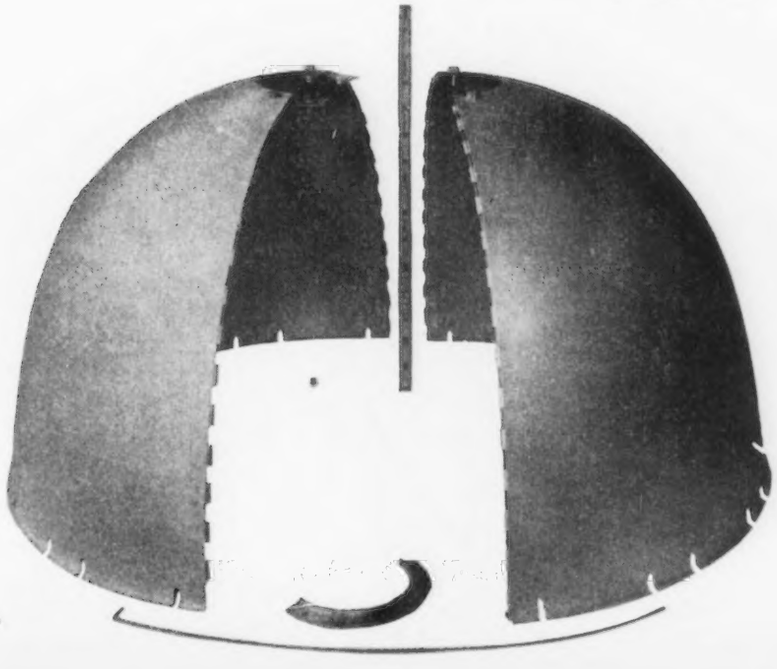

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FIG. 4—Helicopter shield assembly shown is a typical product of a combination of fabricating processes, being made by a succession of spinning, hand forming and riveting operations.

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The use of steel for chucks is determined by the necessity of maintaining close tolerances or interchangeability, by the fineness of finish desired or by the length of the production run. If 1000 or more parts are needed, a wooden chuck of simple contour will change its shape due to the pressure of the spinning operation and a steel finishing chuck is necessary. Wood chucks, like all wood products, are subject to marked thermal and humidity changes and are, therefore, often not practical for the production of long runs when close tolerance or good finish is required.

Other materials, such as composition board, masonite blocks or wood forms covered with a spun steel shell, are used for chucks, and are usually designed to match the inside contour of the finished piece, although in special cases they are made to match the outside contour. Where the product is shaped similar to a bottle or flask with a narrow neck, the design of the chuck is often more elaborate, since it must be made in removable sections in order that it may be readily inserted and removed from the piece.

Where there is little change in contour, a spinning operation becomes essentially one of metal forming; but where there is considerable change in contour, or the depth of the finished piece is great compared with the diameter, spinning involves a flow of metal similar to that experienced in deep drawing on a power press. In spinning, the flow of material is greater than on a power press, especially when heavier gages of soft stock are used. Depending upon the depth of the draw, the blank size in spininng is occasionally as small or even smaller than the diameter of the finished piece. The blank size must be determined entirely by the individual design, but in general, material sizes for spinning are smaller than those required for press operation.

The flow of material which takes place under the tool in the spinner's hand suggests that specified sheet thickness must be greater than the minimum allowable thickness of the finished article. The considerable flow of metal also means that wall thicknesses can be built up or reduced at given places almost at will by a highly skilled spinner, provided the stock is annealed or is soft enough to permit such action without breaking.

The movement of metal which takes place under the guidance of the hands of the skilled worker also explains how springback is controlled by an experienced spinner. Greater control and rigidity is accomplished, however, when beaded edges or flanged surfaces are included in the design. To provide sufficient material for manipulation, the product designer should not consider using extremely thin materials without careful consultation with a reliable and experienced manufacturer of spun articles.

Associated with the material flow is the significant design characteristic that precision contours can be maintained on the side of the material adjacent to the finishing or sizing chuck. This is usually the inside measurement or diameter. Where greater precision is required, an object may be spun of thicker material than needed and then machined to size by a skim cut through a milling or a lathe operation subsequent to the completion of the article.

Highly skilled craftsmen in the spinning trades are distinguished by the quality and quantity of their production of difficult shapes. Some of the factors contributing to this perfection are the proper use of lubrication on the surface being spun, the manner in which tools are cleaned, the avoidance of chip marks or scratches on the product, and the ability to flow material without leaving tracks or ridges. When spinning at elevated temperature, these requirements are more difficult to fulfill because under such circumstances only a well-trained man can maintain proper lubrication. The skill of the craftsman is also quickly evident in the ease with which he performs difficult beading operations and deeply drawn compound curvatures.

It is occasionally economical to perform combination power press and spinning operations. For example, where a die is needed to size a product, the part may be partially made by spinning and later sized, or it may be bumped or

(CONT. ON PAGE 133)

FIG. 5—The wide range of spun sizes possible is indicated by the comparative diameters of the air-conditioning outlets shown in this photo.

Rupture Testing In A 48-Bar Furnace

The largest rupture testing furnace ever built, a 48-bar unit, is described in this article, with the author indicating some of the unusual construction features that make this unit flexible and accurate.

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By J. D. NISBET
Research Laboratory, General Electric Co., Schenectady

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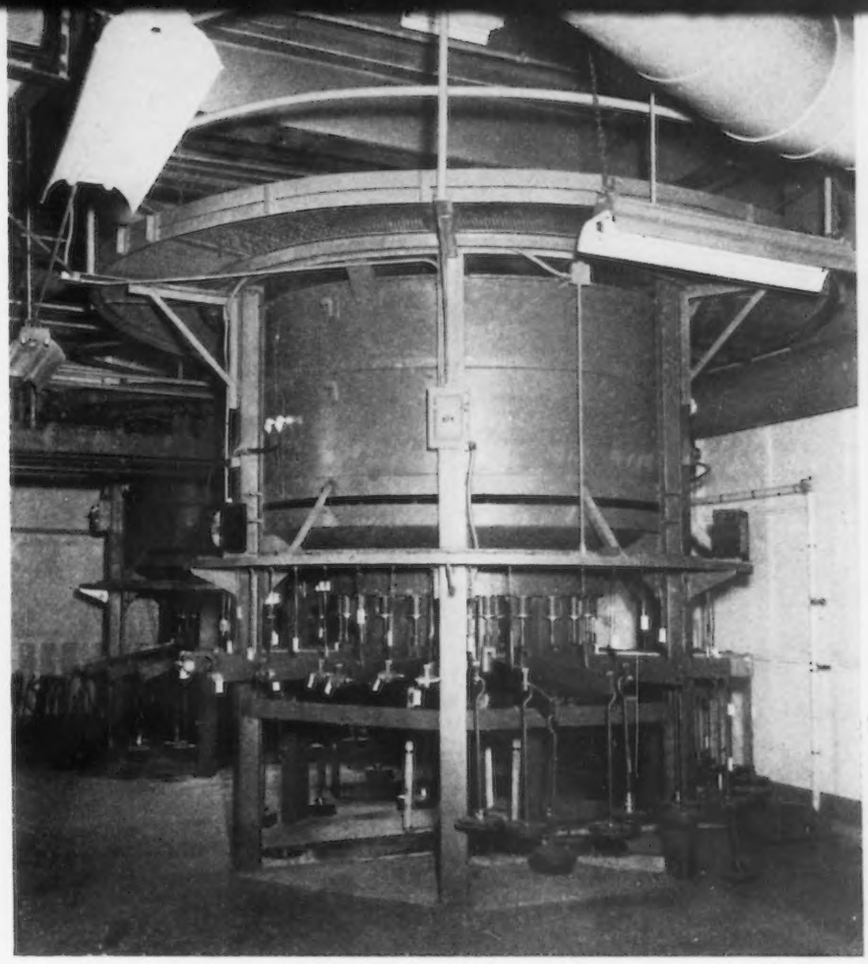

FIG. 1—Close-up view of a 48-bar, rupture testing furnace.

RUPTURE testing machines are becoming common tools in industrial, university, and government laboratories where high-temperature properties of materials are studied. There are very few standardized designs, but this is no doubt a healthy condition at this stage of progress in spite of the fact that rupture testing, as it is ordinarily performed, is a simple procedure. It consists of loading a sample with a dead weight, maintaining the sample at a constant temperature, and measuring the time it will support the load. Often the elongation is measured at frequent intervals to determine creep.

The fundamental metallurgist would prefer to measure the exact shape of the specimen throughout the test and perhaps change the load as the test progresses so that the stress would be more constant rather than increasing with unobserved necking of the specimen. The engineer, however, wants to be assured that the part will not break in service in years to come, even if it does stretch within a designed limit. The engineer is interested in constantly changing temperatures as well as cycling loads; the part might bend, too, and certainly an atmospheric environment other than hot air is involved. But again diverse interest exists. The metallurgist wants to reduce the variables in testing. He would rather separate corrosion entirely from rupture testing by employing a vacuum or an inert atmosphere and independently evaluate corrosive atmospheres by other tests. The engineer is confounded with tremendous temperature gradients in high-temperature machine parts and naturally seeks the effect on strength. The metallurgist strives to control temperature within narrow limits and cannot tolerate temperature gradients in the test specimen.

Today, rupture testing is primarily a laboratory tool and leaves a great deal to the engineer's judgment in the application of materials. The machine discussed in this article was not planned as a compromise between the two schools of thought, but it does incorporate some unusual features:

(1) It is the largest rupture testing furnace ever built.
(2) It is sealed so that tests can be made in atmospheres other than hot air.

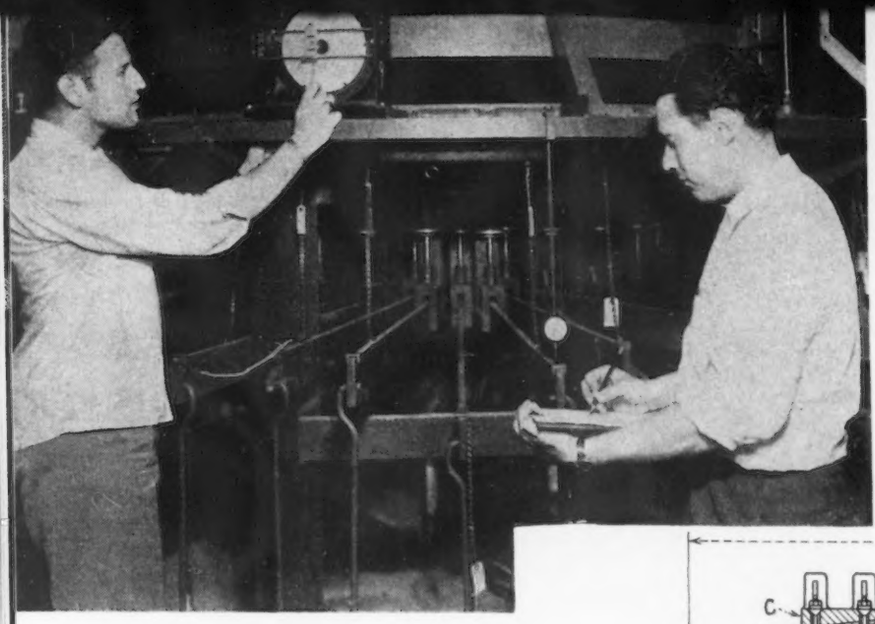

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FIG. 2—An operator is shown setting up a recording extensometer, with another operator taking extensometer readings from a dial gage.

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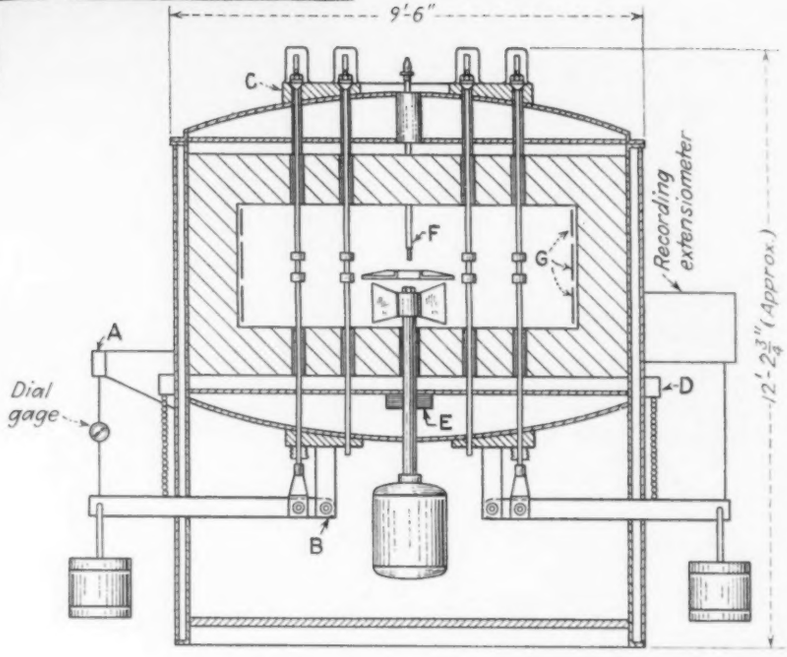
BELOW

FIG. 3—Schematic sketch of the construction of a 48-bar rupture testing furnace.



(3) A central internal fan is provided for circulation.

(4) Ball bearings are used in the leverage loading systems instead of knife edges, and

(5) The shell is designed for great rigidity which should improve creep measurements.

(6) The furnace has 48 stations, and is so large that loading the furnace is a two-man job. The test-bar holders are quite long, to reach through well over 2 ft of furnace insulation and structural supports — with advantages come disadvantages.

Four 48-bar rupture testing furnaces are installed in the furnace testing room. Fig. 1 is a close-up view of one furnace and in Fig. 2 is shown one operator setting up a recording extensometer with another taking extensometer readings from a dial gage.

Fig. 3 shows a schematic cross-section of one furnace. The bar is loaded in the conventional manner. There is a 10:1 leverage arrangement. Creep or extension data are taken from the end of the levers. The relative motion between the creep data reference ring *A*, (fig. 3) the fulcrum *B*, and the top support *C* is practically negligible, so the creep data are fairly reliable.

A bellows is used at each bottom holder and a cap at the top holder to form the seal between these movable parts and the furnace. A plugged-in receptacle *D*, connected to the lever arm with a small chain, serves as the switch to stop a clock when the bar breaks and the lever falls. The fan is operated by a shaft from an external motor as shown. The packing gland *E* forms a seal about the shaft.

The test bar holders are of such design as to give a certain amount of flexibility between test specimen and holders. Because of the length of the holders, it is difficult to load very brittle materials when the specimen is threaded and screwed rigidly to the holder.

A thermocouple for controlling the furnace temperature is located in the center of the heated zone, *F*. The heating elements are located around the vertical wall of the heated chamber. The three separate elements, *G*, enable adjustment of heat and therefore vertical temperature distribution control. The size of the test specimens normally used is quite small in comparison to the total furnace area. An exploration of 1200° F with thermocouples welded to the specimen and holder ends showed a negligible variation throughout the specimen length and a maximum of 2°F between specimens. At 1200°F the temperature distribution is very good without the fan. The distribution at lower temperature is expected to be improved with air circulation.

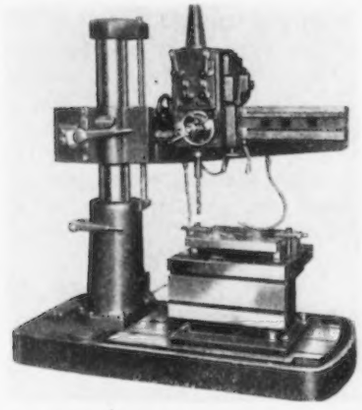
When it is necessary to study time-dependent properties like rupture strength at high-temperature, multiple station machines of the kind described here are extremely valuable.

New Equipment . . .

Radial and precision drill presses, a 200-ton hydraulic press for straightening weldments and castings, a 3-kva spot welder, heat-treating furnaces, a combination drum and belt conveyer cleaning machine, portable air compressors, and a magnet crane for handling scrap are discussed herein, together with a radiation survey meter, a production recorder, and a glass fabric conveyer belt.

Radial Drill Press

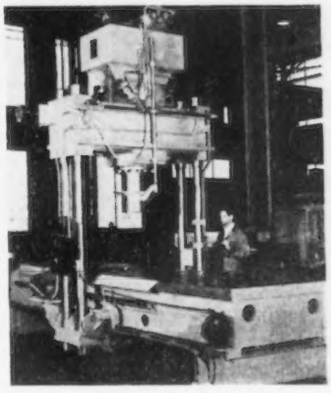
ANNOUNCEMENT of a bantam size radial drill press, with a maximum operating capacity of 1-in. in cast iron has been made by *Canedy-Otto Mfg. Co.*, Chicago Heights, Ill. The unit is available with a 3-ft arm and 7-in. column, has 9 spindle speeds. It is equipped with a single speed motor and 6 rates of power feed. Two motors are used; one main driving motor for the head mechanism and one fractional hp motor for the power elevating mechanism of the arm. All shafts are mounted on ball bearings. The unit has a base of semi-cast steel castings; column is of tubular steel. Feed transmission



is an independent unit held in position and in proper gear mesh with the pick-off power transmission gears. Feed clutch permits feeding either downward or upward. Tapping capacity is ¾ in. in cast iron. Spindle bore is No. 3 Morse taper; spindle travel, 10½ in.

Straightening Press

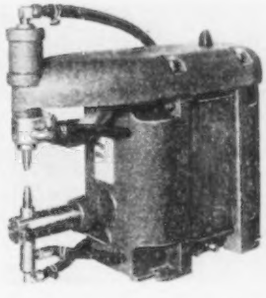
DESIGNED for straightening weldments, castings and other large area parts, a 200-ton hydraulic press has been announced by *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio. A feature of this press is that maximum pressure can be applied at any point within a 120 x 38-in. area of the stationary press bed. Pressure ram is



movable for 120 in. in a horizontal plane along the bed and can also be traversed for 38 in. in a horizontal plane at right angles, between the two sets of strain rods. The press is a selfcontained unit requiring only electric power for operation. A Hydro-Power radial variable delivery type pump generates the hydraulic pressure. Oil is used as the pressure medium. Maximum daylight space between ram facing and bed is 36 in. Maximum ram travel is 18 in. A 5-hp electric motor drives the hydraulic pump.

Spot Welder

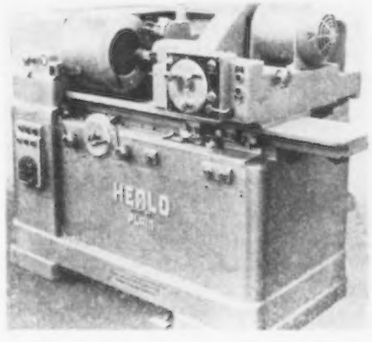
THE 3-kva spot welder produced by *Banner Products Co.*, 4964 N. 29th St., Milwaukee 9, is a low



cost, air operated spot welder that is adaptable to many uses. It operates with equal ease in any position, it is reported, is quickly adjusted to new applications, and because of its simple design, requires but a minimum of maintenance. Transformer is watercooled, 220 or 440 v, 60 cycle, having 3 ranges of heat regulation. The lower arm of 1¼-in. diam hard-drawn copper is equipped with ¾-in. diam watercooled holders designed to take standard No. 1 Morse taper points. Throat measures 5 in., stroke, 1 in. Several units can be operated simultaneously with a single foot-switch on a part requiring several welds.

Internal Grinding Machine

MODEL 271 plain internal grinding machine has been developed by *Heald Machine Co.*,

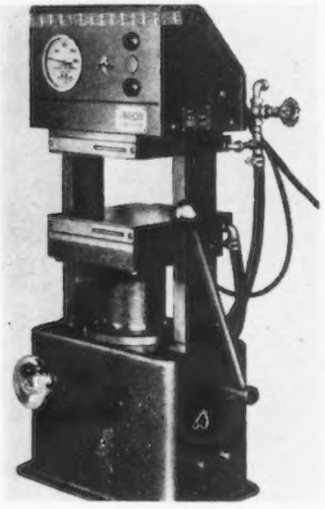


Worcester 6, Mass., for small to medium lot production where an automatic cycle is not required. The machine features quick setups for maximum versatility. All elements of the grinding cycle can be rapidly and accurately set for rate and amount on the centralized control panel of the wheelhead cross slide. Motor and pump units are isolated from the base, lubrication is automatic, and rugged workhead construction and hydraulic refinements providing for constant feed and speeds, it is stated. Maximum length of hole that can be ground is 8 in.; diameter of hole, ⅛ to 5

in. Table travel is 16 in. with speeds unlimited between 0 to 35 fpm.

Hydraulic Press

FOR operations requiring pressure up to 20 tons and which may also require heat, *Preco Inc.*, 960 E. 61st St., Los Angeles, has



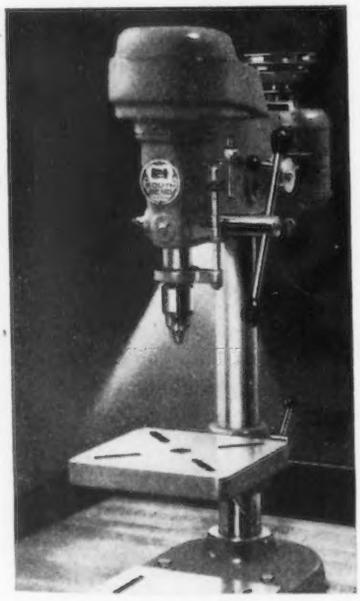
made available the PA7 hydraulic press which is a bench type unit standing 32 in. high. The hydraulic hand pump incorporates a high-speed stroke for quick platen closure which converts semiautomatically to a high pressure stroke for producing a maximum force of 40,000 lb. The press may be used individually or in batteries with the hand pump or connected to a central hydraulic system. Electrically heated, water-cooled platens are standard equipment but platens for heating from a central steam plant or for cold work may be supplied. To double the capacity of the press, a third platen is installed between the two standard platens. Platen sizes of 8x8 or 8¾x12 in. are available. They open from 0 to 8 in.

Air Control Valves

FOR directional control of compressed air flow, *Hannifin Corp.*, 1101 S. Kilbourn Ave., Chicago 24, has introduced an electrically operated 4-way valve which is primarily designed to provide push button control for small, air operated presses, and similar units. The valve is a packless reciprocating disk type, pilot operated and solenoid controlled. It is built in two types, type 1 for double solenoid operation using two push buttons or limit switches, type 2, for power offset operation using a single button or switch. Both types are said to be capable of 180 or more operating cycles per min in handling air pressure from a minimum of 25 psi to a maximum of 150 psi. Standard models are built for 115 v, 50-60 cycle circuits.

Precision Drill Press

BENCH and floor models of a 14-in. precision drill press are being manufactured by *South Bend Lathe Works*, South Bend, Ind., each having a capacity to drill ½ in. in iron or steel at the center of a 14-in. circle. Features include a built-in light with independent switch providing shielded illumination for the work area. A quick-acting belt tension release lever simplifies changing the spindle speeds and returns the vertical mounted motor to its original position after each change, thus maintaining the same belt tension for each of the four cone pulley steps. The spindle has a maximum travel of 4 in. with spindle speeds of 707, 1305, 2345, and 4322 rpm. A depth gage is graduated in sixteenths of an inch and has adjustable collars to control both the depth of feed and the length of the return stroke. The bench model drill press has 10⅞ in. maximum chuck to table distance, 10⅞ in. table travel, 17



in. max chuck to base distance, and 10¾ x 17¾ in. slotted base. The floor model has 40⅛ in. max chuck to table distance, 40⅛ in. table travel, 46½ in. max chuck to base distance, 15 x 21 in. slotted base. The press is supplied with or without motor. A 1/3 hp, 1725 rpm vertical mounting type motor is recommended.

Chip Breaker Grinder

MODEL C-4 chip breaker grinder featuring an any-angle vise and reciprocating table has been announced by *Hammond*

Machinery Builders, 1600 Douglas Ave., Kalamazoo, Mich. The vise has four swivels, each of which is equipped with a dial graduated in degrees, permitting the setting of the tools at any desired angle. The reciprocating table provides free, precision table movement by means of a hand operated lever. Capacity of the machine is for all types of box and single point tools up to 2 in. Chip breaker wheel has 4-in. diam, ⅛ to ½-in. face. Speed with 60 cycle dc motor is 3500 rpm; with 50 cycle motor, 2900 rpm.

Grinding Coolant

DEVELOPMENT of Silver-Chip No. 2 grinding compound for copper, aluminum, brass, and cast iron, has been announced by *Machinery Lubricants, Inc.*, 31 St. James Ave., Boston 16. Advantages claimed for the lubricant are cleaner grinding wheels and machines, use of finer grit and harder grades of wheels without burning, rust elimination, lack of foam and rapid chip settling. It is also claimed that wheel dressing is reduced and a smoother finish obtained.

Cleaning Machine

A combination drum and belt conveyer wash, rinse and dry machine has been announced by

Cincinnati Cleaning & Finishing Machinery Co., Hecla St., Ironton, Ohio. Parts are fed into the machine for cleaning through a loading hopper. A loading station is

provided which feeds parts to the belt conveyer. Small miscellaneous parts are cleaned in the drum, whereas larger and more delicate parts are cleaned on the belt. Thermostatic control is provided for both the solution and the oven.

Protective Coating

PEELCOTE, a protective coating for metal parts which can be easily and quickly peeled off, it is stated, has been developed by *Watson-Standard Co.*, 225 Galveston Ave., Pittsburgh. It is an air-drying coating designed to protect from scratches, chips and corrosion during shipment, storage, handling and some types of fabrication. It is applied by spray or dip methods, available in clear transparent or solid black.

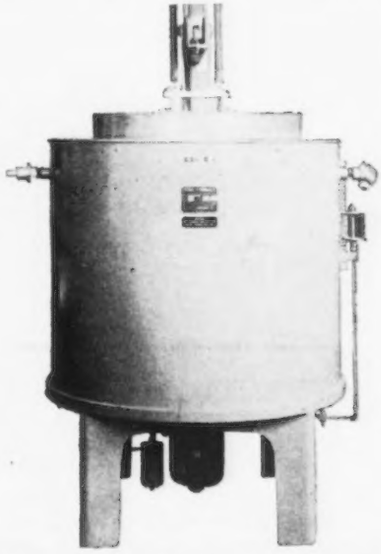
Radiation Survey Meter

FEATURING exceedingly small dimensions and weight, a portable beta-gamma radiation meter

of the ionization type has been announced by *Tracerlab, Inc.*, 55 Oliver St., Boston. It is useful for laboratory work where radioactivity of the order of millicuries is handled. The instrument weighs 5 lb and is housed in a case of bakelite and aluminum. Power is supplied by small batteries mounted in a replaceable lucite enclosure within the instrument case. Three full scales of approximately 100, 1000, and 10,000 milliroentgens per hour enable quick measurement of a wide range of dosage rate. A thin window at the end of the ionization chamber permits entry of beta particles with energies much less than 0.1 Mev, and a permanently mounted ¼-in. thick rotary bakelite shield can be slid in front of the window to eliminate beta radiation.

Heat-Treating Furnace

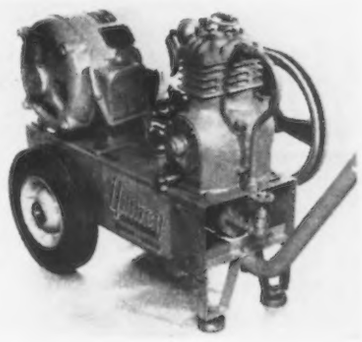
HIGH-PRECISION tempering can be performed continuously at 1650°F, it is said, in a new series of Homo furnaces announced by *Leeds & Northrup Co.*,



4934 Stenton Ave., Philadelphia 44. High-temperature stress relief, cycle annealing, spheroidizing, normalizing and similar heat-treatments of ferrous and nonferrous parts are typical operations. Lower-temperature work can be handled in the same furnace. One feature of the new furnaces is a ribbon type heater of the heavy variety used in Homocarb furnaces. Fan motors have a water-cooled gland to protect against overheating. High temperature Homos handle big, dense loads on a mass production basis. Capacities vary from 1.8 cu ft (15 in. diam x 18 in. deep) to 33.4 cu ft (35 in. diam x 60 in. deep.)

Air Compressors

TWO new portable air compressors for automotive and industrial use have been added to the line of compressors manufactured by *Quincy Compressor Co.*, Quincy, Ill. The TX-8, illustrated, furnishes pressures of 70 to 80 lb.



It is especially suitable for use as a portable air supply in industrial plants. Gasoline engines or electric motors can be used to supply the necessary power for the TX-8 model. Model T is a large portable air compressor unit for paint spraying, chipping, riveting, and caulking as well as drilling, and inflating tractor and truck tires. Compressor is of the single stage, duplex cylinder, air cooled type with automotive type pistons furnishing displacements of from 11.1 to 44.0 cfm depending upon the model.

Production Recorder

THE Model X Chronolog, product of the *National Acme Co.*, Cleveland 8, has been designed to record, at preselected intervals, when, for what cause, and how long a machine is idle. The tabulated production record also indicates the number of units produced

in feet or pieces, and the productive time required. The record is claimed to show discrepancies between rated efficiency and actual performance. Data obtained from the Chronolog system are said also to point to the simplification of payroll and cost accounting, production scheduling, and time study

standards. This system of production control is said to be applicable to production jobs which are subject to interruption.

Drum Grips

HANDLING of open top containers, sheet stock, boiler plate and other materials can be time saving, convenient and safe, it is claimed, with the use of Granny-Grips, announced by *Industrial Products Co.*, 2837 N. Fourth St., Philadelphia 33. Jaws operate on an eccentric principle whereby the heavier the load being applied the tighter the grip. They are made in single and double strand construction both with a throat capacity of 0 to 1 in. Single strand unit tests to 7850 lb, is fitted with 14½-in. chain. Overall length measures 29½ in. The double strand unit is made up of two of the single strand units, with a center connecting link having an inside opening of 2 x 7 in.

Impact Wrench

HAVING a nominal capacity of ⅝-in. bolts, yet said to have ample power to set nuts ordinarily requiring larger and heavier nut

setters, an impact wrench, size No. 18-6, has been announced by *Keller Tool Co.*, Grand Haven, Mich. Simple, direct impacting mechanism is used; there are no springs, gears, clutches or complicated devices. An air motor of the rotary type furnishes the speed and power for fast nut running. By means of a simple built-in torque regulator, power is adjusted to torque requirements of the individual job. The tool can be operated in reverse for disassembly and dismantling operations.

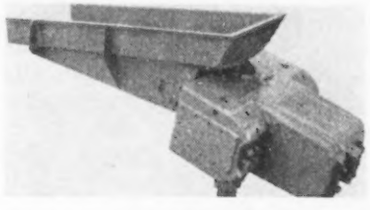
Magnet Crane

FOR handling iron and steel scrap and ferrous foundry products, a one-man, single-engined, self-propelled magnet crane has been announced by *Wayne Crane Div., American Steel Dredge Co., Inc.*, Fort Wayne, Ind. Designated as model 22A, the new crane has hydraulic steering, an 8-ft wheel base and a 22-ft turning radius. It accommodates 29 or 36-in. electromagnets powered by 3 or 5-kw generators. The machine is

equipped with a Rud-O-Matic magnet tagline reel and has over-sized drums and clutches which are said to provide more precise control at all boom angles for piling, loading and unloading operations. The crane moves, lifts, booms, and swings simultaneously or independently. The machine can be converted to a utility crane, clamshell or dragline, all attachments being used on the same 30-ft boom.

Vibrating Feeder

AN electric vibrating feeder with an enclosed power unit has been announced by *Jeffrey Mfg. Co.*, Columbus, Ohio. The unit was designed specifically for use in installations where the material to be handled is magnetic, dusty, heated and abrasive. In addition to being entirely dust tight, it is also provided with air inlet and outlet features so that a stream of air may be circulated through the motor to build up if necessary a slight in-



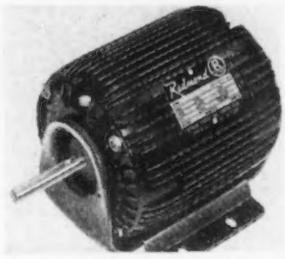
terval pressure which would act as a double insurance toward keeping the dust out. The unit would be of interest to users of electric vibrating equipment in sintering plants, foundries, slag plants and other operations where the atmosphere carries hot magnetic float dust.

Glass Fabric Conveyer Belt

DEVELOPMENT of a hot material conveyer belt using glass fabric instead of cotton fabric has been announced by *B. F. Goodrich Co.*, Akron, Ohio. Two weights are available, a four-ply for light service and a five-ply for wider, longer belts where working stresses will be somewhat higher than in the light service. Covers recommended are either a 5/32-in. top and 1/32-in. back or a 3/16-in. top and 1/32 in. back. Included in the belt's top cover will be a ply of longitudinal nylon breaker. Advantage of glass fabric for this service, the company states, is its resistance to loss of carcass strength under high temperatures.

Electric Motors

ADDED to the Micromotor line of electric motors manufactured by the *Redmond Co., Inc.*, Owosso, Mich., is the new type Y, 6-pole shaded pole fractional horsepower motor for applications specifying 1000 rpm with full rated loads. The line includes ventilated models up to 1/15 hp, and totally enclosed models up to 1/20 hp. Both types handle deep pitch fans with a minimum of air sound. Die



cast cases, machined for accurate alignment, are formed with finned surfaces for maximum cooling. Flush-weld rotors, precision skewed, have completely filled slots that cannot collect dust, dirt or chips. Six-pole motors may be operated in any position without change in construction.

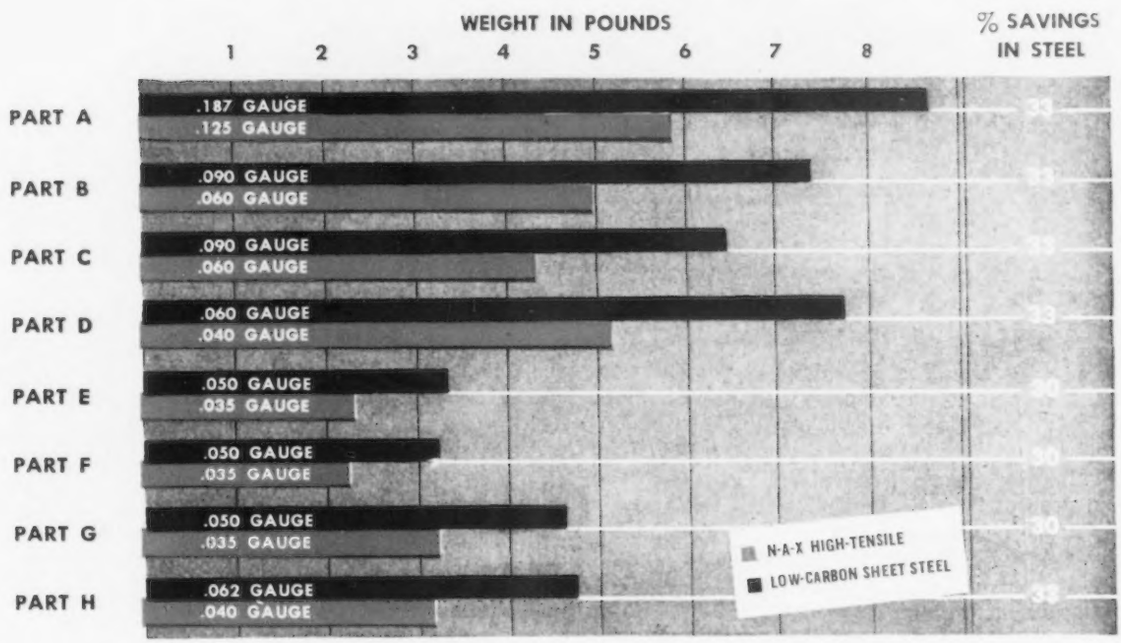
Tube Cutter

ADVANTAGES claimed for a tube cutter manufactured by *Capewell Mfg. Co.*, 624 Filbert St., Philadelphia, are listed as elimination of reaming, operation by hand pressure with one hand, automatic adjustment to ¼ and ¾-in. OD tubing, and ability to cut dented tubing. Cutting wheels make a complete cut by rotating the tool slightly beyond a 120° arc.

THE NEW ARITHMETIC IN STEEL

ACTUAL PRODUCTION FIGURES MORE THAN PROVE IT:

3 TONS N-A-X HIGH-TENSILE > 4 TONS CARBON SHEET STEEL



We have claimed that N-A-X HIGH-TENSILE can effect a 25% saving in steel. This graph shows the results when one leading manufacturer switched from carbon steel sheets to N-A-X HIGH-TENSILE . . . utilized thinner sections with no sacrifice of strength . . . and saved up to 33% in steel.

The change was made because of the unique combination of properties of N-A-X HIGH-TENSILE. With its 50% higher physical properties, it has exceptional formability for a high-strength steel, and can be formed and drawn into intricate shapes with little or no change in dies or machinery adjustments. It has excellent weldability, great impact toughness, high fatigue- and corrosion-resistance. These qualities not only provide a more durable product, but often effect economies in fabricating and handling. Based on *over-all costs*, N-A-X HIGH-TENSILE compares favorably with carbon sheet steel.

Today's supply of N-A-X HIGH-TENSILE is insufficient to meet the demand, but we are looking forward to the day when we can fill your needs. When that time comes, our engineers and metallurgists will be glad to work with you to determine just how much steel you can save by using N-A-X HIGH-TENSILE.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify N-A-X HIGH-TENSILE STEEL

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Assembly Line . . . WALTER G. PATTON

• Gas shortage closes many Detroit industrial plants . . . Cadillac introduces its 1948 models . . . Ford offers Dynamatic Fan as an accessory.

DETROIT—The gas shortage has pulled auto production down from 109,865 two weeks ago to 82,802 this week, according to Ward's Reports. This is a drop of 27,000 units in a fortnight which has resulted primarily from the gas shortage. With rapidly falling auto output have come extensive employee layoffs which have had the effect of reducing factory employment in Detroit to the lowest levels since 1935, according to the Detroit Board of Commerce.

Looking at individual Detroit plants, an estimated 50,000 of Chrysler's 70,000 employees are currently idle. Briggs has all but 500 of its 21,000 employees laid off. A total of 5500 out of 8400 Packard workers are remaining at home. Other plants in this area which have been hard hit by the gas shortage are Eaton Mfg. Co., Kelsey-Hayes Wheel, Congress Die Casting Div., Atlas Foundry Co., Hoskins Mfg. Co., Wolverine Tube Co., L. A. Young Spring & Wire Co., Detroit Steel Corp., Commercial Heat Treating Co., Federal-Mogul Corp., Gemmer Mfg. Co., Midland Steel Products, McCord Mfg. Co., and Continental Die Casting Co. This is in addition to a number of automotive suppliers in Ohio who have been laid off for 10 days or more because of the critical gas supply situation.

At the moment there are reports that oil will shortly be delivered to Detroit which will make possible the production of manufactured gas. If this program goes into effect as now planned, Detroit industrial plants may get back into operation as early as Tuesday of next week.

However, auto officials have warned that a pickup in factory schedules, however desirable it may be, will probably be slow. The biggest question mark in the present situation is whether or not vendors' plants will operate a sufficient amount of overtime to make up for the 10-day loss of production which has resulted already from the gas shortage.

As the week closed, the effects of plant shutdowns were beginning to be felt. With the Chevrolet Gear & Axle unit in Detroit closed, a shortage of parts had spread to Flint where the Chevrolet Assembly plant was forced to suspend operations.

One factor about the present gas shortage which is puzzling many Detroiters is that the extent of plant shutdowns is much greater than had been anticipated even after consideration is given to the extremely low temperatures prevailing here during the past two weeks. It has been predicted around Detroit for several months that a gas shortage would undoubtedly hit this area. Practically no one, however, dared to predict such drastic effects on automobile plant operations.

* * *

FOLLOWING the introduction of the Oldsmobile Futuramic (THE IRON AGE, Feb. 5) Cadillac introduced its new postwar model to the press here this week. During the next few weeks showings of the new car will take place throughout the country. Prices have jumped 9.8 pct for the new model.

Since Cadillac uses the same body as the Olds 98, the same characteristics are emphasized—a long low silhouette, front fenders that blend into the extended sides of the body, a lower and wider radiator grille, substantially increased glass area and thinner front posts for improved vision.

In the case of the Cadillac, the rear fenders are raised to form vertical fins into which newly designed tail and directional lamps are fitted. As in the case of the previous Cadillac, the gas tank filler cap is neatly concealed in the left rear fender.

Headlamps are recessed in the upper portion of the front fenders with the combination parking and directional lamps also recessed in the fender below the headlamps.

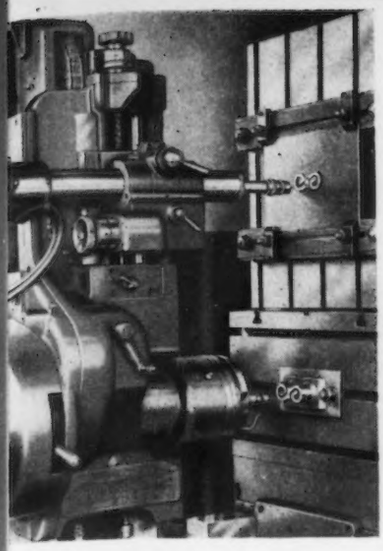
The new curved windshield slopes backward at approximately 45 degrees. Chromium-plated wipers are especially designed to fit the curved glass section.

Weight of the new Cadillac has been increased by approximately 75 lb which is accounted for by a wider, heavier body, more glass and heavier tires and wheel rims. The increase in total steel requirements will probably not exceed 35 lb and may even be less.

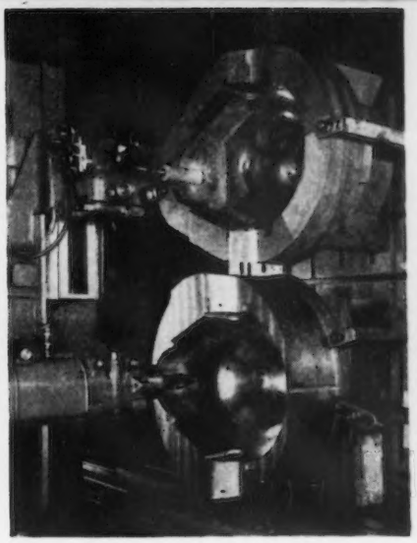
Due to a design change the bumpers which have more chromium showing than the design used on 1947 models appear to be wider. However, bumper weights are about the same as those of the previous models except the rear bumper which has been increased in width at the corner to afford better protection for the sides of the car. Bumpers are made in three separate sections which are individually plated.

The new Cadillac features low pressure tires requiring only 24 lb pressure. The tires are mounted on a 15-in. wheel. On some models hydraulically actuated windows are available with push button control. Door hardware is heavier and has been redesigned to "fit the hand," according to a Cadillac spokesman. Despite its new low appearance, overall height of the new model is about the same as the 1947 model.

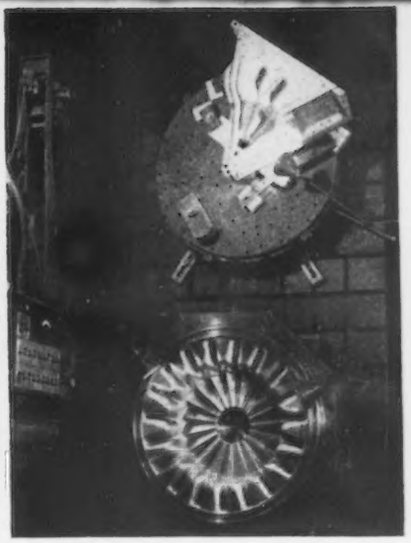
In its 1948 models Cadillac is offering for the first time a com-



Profiling the punch for blanking a tiny manganese bronze flat spring from a sheet metal template. Punch, die and stripper were milled on the same machine. This is typical of two-dimensional Kellering, jobs ranging upwards from this small one.

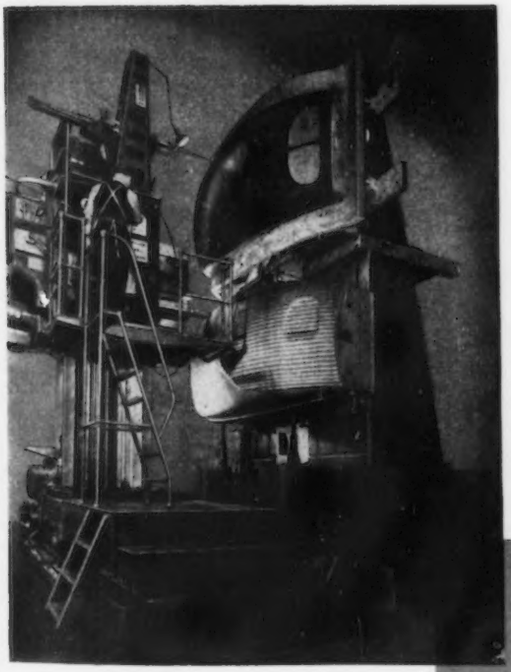


This will be a permanent mold for the precision casting of aluminum power-lawnmower housings. The three-dimensional master shown here is made of wood; Kellering can also be done with masters of plaster, or any other easily worked material.



This would be difficult and complex without a Keller—milling a forging die for a jet engine impeller. Tracer-controlled milling faithfully reproduces the three-dimensional partial model in each successive index position, to produce a perfect completed die.

Has everybody here seen Keller?



The largest of the Kellers, Type BG-3, is finish-cutting (after roughing out) a huge die for an automobile roof panel, tracing a master cast made from the final approved mock-up. It required Kellering to make large dies like this possible and practical. Without Kellering, modern streamlined cars would not exist.

Picture a machine with an extremely delicate sense of touch . . . one that can trace every contour of an intricate model or master — and deftly translate it into tough metal — automatically, accurately, economically.

That's Keller at work. Versatile, dependable, productive — it can save you time and money regardless of the complexity of your die or mold making problems, in both machining and finishing stages.

Tracer-controlled milling or "Kellering" is the accepted modern method of creating dies and molds rapidly at least cost. One or more of the seven sizes of Keller machines (which can be arranged to give 14 work capacities) will meet your needs, whether they be for die-casting dies, forging dies, or plastic molds. Write for literature. Pratt & Whitney, *Div.* Niles-Bement-Pond Company, West Hartford 1, Conn.

Pratt & Whitney Keller Machines

Tracer-Controlled Milling automatically reproduces, in tough alloy steel, both two- and three-dimensional master shapes.

pletely enclosed instrument panel. All driving instruments are grouped in a compact cluster which has been moved closer to the steering wheel and "to the optical distance recommended for best reading." A new steering column jacket completely conceals the gear shift columns behind the instrument panel extension. The new "bin-type" glove compartment is located in the center of the panel below the radio grille rather than at the right side.

The extent to which the new auto body designs permit wider seats in the car is indicated by the fact that front seat hip room in the 61 Series has been increased 3¼ in. to 63¾ in. Shoulder width has also been increased. Rear seat hip room has been increased 1⅞ in.

Cadillac engineers report the new type of compression bumper and relocation of rear shock absorbers is a distinct advance over the previous design. The steering ratio has also been changed to permit easier handling of the car.

Cadillac is again offering Hydra-Matic drive as optional equipment. During 1947, according to Don E. Ahrens, general sales manager, the demand for Hydra-Matic reached 98 pct.

* * *

A DEVICE which auto engineers have predicted will become standard equipment on many cars has been introduced as an accessory by Ford. Produced by Eaton Manufacturing Co. of Cleveland, this accessory operates only when needed and at driving speeds where additional cooling by the fan is necessary.

Properly installed on a car, the Dynamatic Fan will operate only a fraction of the running time and rarely at top speeds. In the meantime, as much as five additional horsepower is made available for driving the car, resulting it is said, in an improvement in both engine performance and fuel economy. Also, since the fan does not run as soon as the car is started, the motor and car heating system is brought to temperature somewhat quicker than at present.

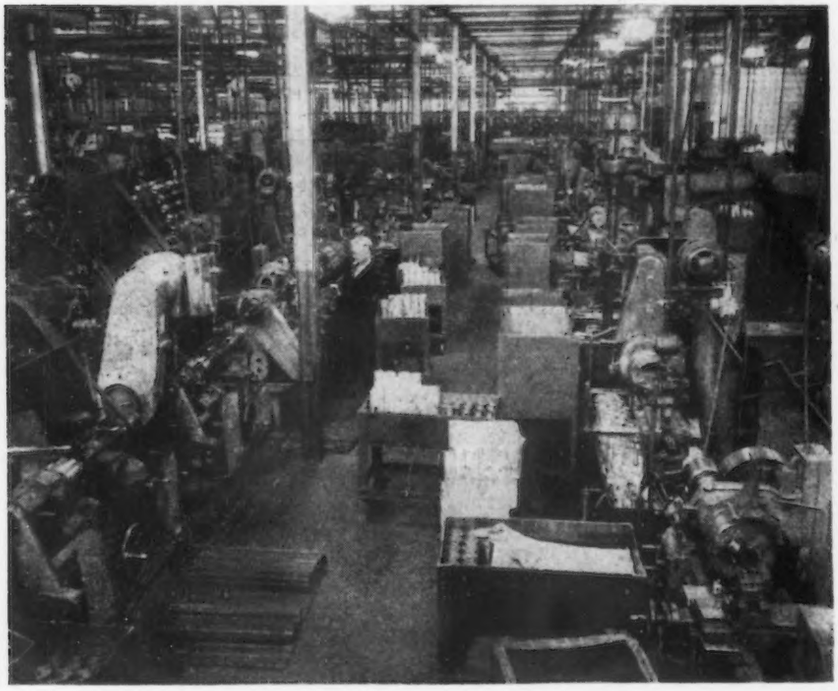
Automatic control of fan operation is ingeniously accomplished by an electromagnetic device which has been extensively used on industrial machines to transmit motion or braking action from one rotating member to another without mechanical contact, friction or shock.

In the device, a drum and a rotor assembly are mounted on a common shaft. When either the drum or the rotor are driven by an external source of power, magnetic currents cause the second member to rotate at a speed which is controlled by the amount of current.

Both the operation and the speed of the fan are governed by a thermostatic switch on the radiator hose. The thermostat varies the supply of electromagnetic current in accordance with the cooling requirements, thus causing the fan to run faster or slower, or to stop when it is not needed.

One result of the adoption of the new accessory is that fan noise, a major source of engine noise, is largely eliminated. Another reported advantage is decreased use of the choke, minimizing sludge and crankcase dilution. Also, more even engine operating temperatures are reported.

PRODUCTION DEFERRED: *A tool repairman is the lone occupant of this aluminum piston plant at Chrysler Corp., Detroit. The plant was temporarily closed by a gas company order which cut off all industrial gas supplies as a result of the cold wave.*



Auto Registrations Show Four Million Sales in '47

Detroit

• • • **Slightly more** than 4 million passenger cars and trucks were registered in the United States during 1947, according to figures recently compiled by R. L. Polk & Co., Detroit, statisticians for the automobile industry. According to Polk statisticians this compared with 2,440,445 passenger and commercial units registered in 1946, and 4,371,863 units sold in 1941.

Polk estimated that approximately 280,000 new cars and 70,000 new trucks will be registered during December.

New passenger car registrations jumped from 1,815,196 registered in 1946 to 3,141,000 in 1947. Truck registrations were also up from 625,249 registered in 1946 to 880,000 in 1947.

Monroe Auto Reports Net

Detroit

• • • **Net sales** of Monroe Auto Equipment Co., Monroe, Mich., for the first six months of the fiscal year ending June 30, 1948, totaled $6,367,925.

Net income for the period amounted to $320,899 after taxes or 71.9¢ per share on common stock.

West Coast . . .

ROBERT T. REINHARDT

• Power shortage hits central California . . . K-F Corp. to spend $4 million on Utah blast furnace . . . Seattle scrap situation tightens.

SAN FRANCISCO—Jokes about California's famous weather are in poor taste among industrialists in central California.

There is no complaint from the average man in the street or the visiting tourist — the weather has been just too good. Skies have been almost monotonously clear instead of filled with the normal seasonal rain clouds for the past several months. Consequently, practically the entire state has been suffering from drought conditions which have had an almost immediate effect on the electric power situation.

Power utility reservoirs are at low levels and steam generating plants are unable to keep up with the heavy demands of expanded industry in the central California area with the result that emergency steps are being taken to curtail electric use.

Last week the first storm of consequence deposited a light blanket of snow in the high Sierra which, normally at this time of the year carries 5 to 10 ft of snow and brought the total precipitation in the central California area within 50 pct of normal. However, this slight contribution to storage reservoirs and snow packs did not prevent issuance of requests by the Pacific Gas & Electric Co., which supplies power for a considerable portion of northern and central California, for cooperation from the general public and industry to curtail excess use of electricity.

Industries have been requested to rearrange shifts wherever possible to lessen power consumption between the hours of 4 p.m. and 8 p.m.; commercial establishments have been urged to reduce or eliminate window lights, flood lighting and electric signs; farmers have been asked to shut down their pumping plants used for irrigation between those hours; and ordinary citizens were requested to use appliances for as short a period as possible.

As long ago as last February, a controversy arose between the Pacific Gas & Electric Co. and Richard L. Boke, regional director of the Bureau of Reclamation at Sacramento, Calif., over the potential power shortage in northern California. Mr. Boke had indicated that a power shortage was in the offing and urged that government owned and planned facilities be completed as quickly as possible. Officials of the PG&E insisted that they saw no indications of a power shortage at that time and that facilities under construction would be ample to care for any situation which arose.

LABOR leaders in the area have made much of the power shortage which has, in fact, caused curtailment of operations in three or four large Bay Area plants which had been purchasing so-called "surplus" power.

In an effort to conserve power, PG&E has periodically reduced its output from 60 cycles to 59½ cycles which has, among other things, affected electric clocks and performance of small electric motors. However, the company insists that this is a temporary expedient and that the situation should be under control within the next week or two when new steam generating plants will come into use.

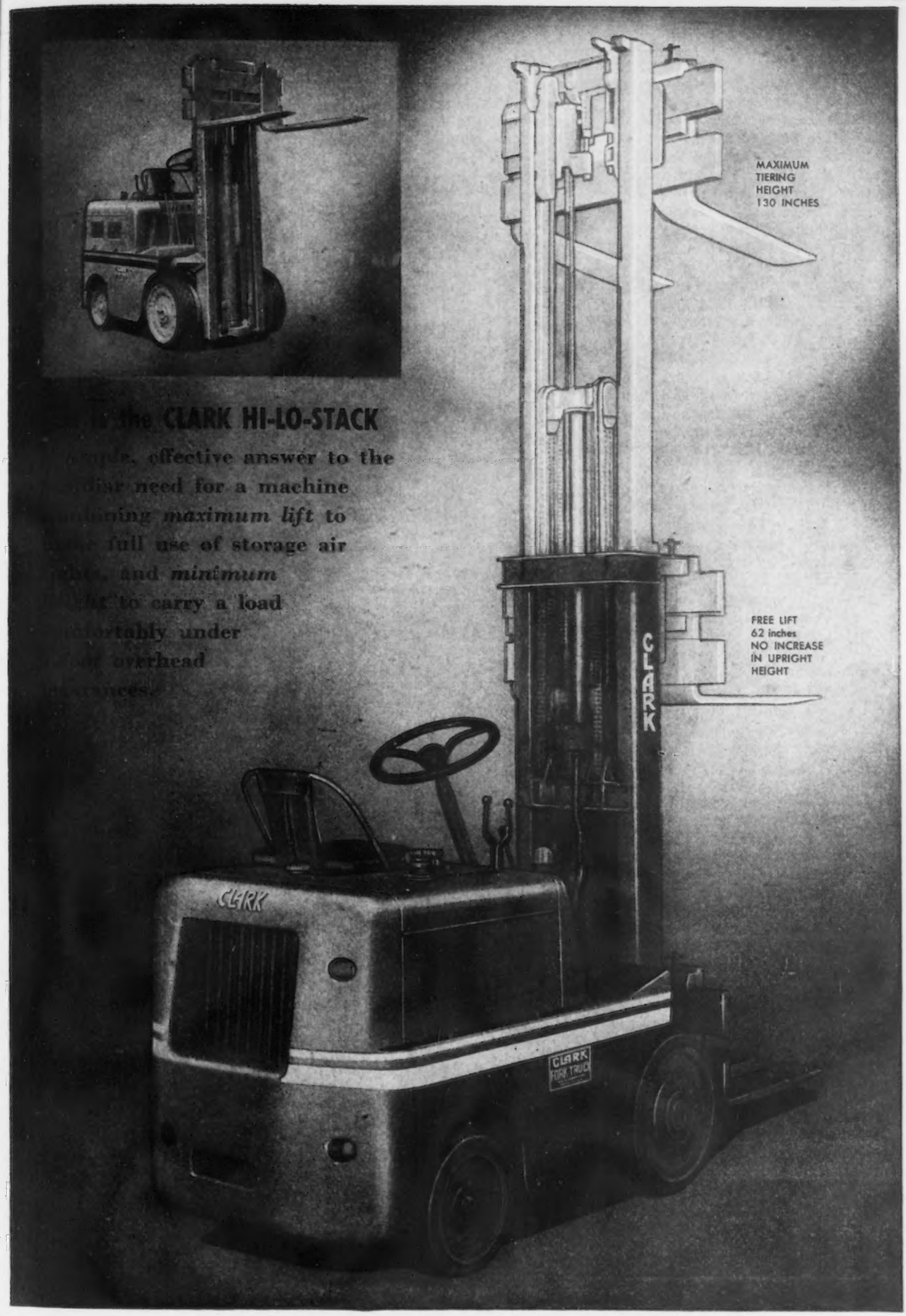
The first large turbo generating unit to be installed as a part of a broad scale, long range expansion program, is expected to be in operation developing 100,000 hp in April. A total of 525,000 hp generating capacity is expected to be available in the next 12 months. Another 200,000 hp will be placed in operation by the Bureau of Reclamation at the Shasta and Keswick plants of the Central Valley project, it has been reported.

James B. Black, president of PG&E Co., recently stated that the large additions being made in generating capacity on the system during the next 12 months will total more than twice the expected growth in power demand in this area and that with new distribution and transmission lines, the area should have "adequate power facilities at the end of the 12-months period."

SALT LAKE CITY—Acquisition of the surplus blast furnace at Ironton and 500 beehive coke ovens at Sunnydale by Kaiser-Frazer Corp. from WAA will involve a capital investment of about $4 million, according to information supplied by company officials to Governor Herbert B. Maw. The price to be paid to the government is $1,150,000. Other major items include reconditioning of the coke ovens and furnaces, construction of new rail approaches to the furnace and construction of 75 new homes at Sunnydale.

As now set up the transplanted furnace can be operated only with the facilities used for Geneva Steel Co.'s Ironton furnace. This was an unsatisfactory arrangement when both furnaces were operated by the same company and would be doubly confusing with separate companies operating the furnaces. May has been set for operation of the furnace.

For the time being the pig iron output of the furnace will be used in foundries of the Kaiser-Frazer Corp. or delivered to suppliers of the automobile company. But local interests are hopeful that it will be operated to supply pig to Fontana when the steel situation makes it uneconomic to ship to the east. An unconfirmed rumor persists that Kaiser-Frazer will put in a foundry



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effective answer to the
need for a machine
maximum lift to
full use of storage air
and *minimum*
to carry a load
ortably under
overhead

near the blast furnace to cast engine blocks and other auto parts.

The $1,150,000 price was negotiated after Portsmouth Steel Co., in which Kaiser-Frazer has a substantial interest, submitted an unsatisfactory bid. Acquisition cost of the furnace, which was moved from Joliet, Ill., to Ironton, was $5,691,000. Cost of the beehive coke ovens was $1,455,000.

Several new production records were set in January by Geneva Steel Co., U. S. Steel subsidiary. The Geneva plant produced 107,949 net tons of steel ingots and castings as compared to a previous monthly high of 102,260 net tons in December 1947. During the month finished steel plate production was 56,059 net tons as compared to 53,919 tons in December 1947, the previous high.

Iron production was 84,949 net tons and furnace coke production 76,780 tons. The previous record was 80,137 net tons of iron and 73,518 tons of furnace coke in December 1947.

A new record was established also by the Geneva coal mine with a production of 146,983 tons. The best previous month was last December with 136,464 tons.

Geneva's Ironton plant likewise set a new monthly record for pig iron with 17,988 tons as compared to 17,973 in August 1947.

SEATTLE—The first snowfall of the winter last week was being blamed to a limited extent for the present local scrap shortage which is becoming acute after a period of relatively good supply. Principal reason, however, appears to be the increased activity of openhearths and electric furnaces in the area, which in part, is attributed to the shipment of ingots abroad.

Cupola No. 1 is moving consistently at $40 per gross ton, although there are rumors of sales of this material running as high as $47.50. Much of this cast scrap has been coming in from the East and shipments have been delayed and almost completely stopped because of eastern storms. Added to this factor are local storms which have interfered with collections and shipments to a modest degree.

Scrap buyers are having increasing cause to complain about the quality of No. 1 and No. 2 heavy melting scrap, although the price remains at $26 per ton.

Northwest Steel Rolling Mills has invested approximately $25,000 in a ship breaking program in an attempt to build up its scrap supply. Heavy expenditures on this program have been for repairs to their dock which has been in a dangerous condition.

This company still lacks means of breaking up the ships below the water line as they have no ways on which they can be drawn up. Because of lack of facilities, the ships they handle must necessarily be small.

The company is considering the possibility of sinking barges below the partially demolished hulls and then raising them so that they will be above the water line for further demolition. If this plan doesn't work out it will probably be necessary for the company to sell the hulls to tug and barge firms for use as scows for transportation of lumber and gravel.

One of the ships to wind up in Northwest furnaces is the MOONLIGHT MAID which was the ship from which the first shot was fired in Admiral Dewey's battle of Manila Bay. It also served in both of the last two wars. Built in 1893 in Philadelphia by William Cramp & Sons at a cost of $450,000, the ship is expected to produce approximately 500 tons of steel scrap. It was set afire to gut the interior before scrapping operations began. Another vessel scheduled for the same fate is a small steamer that once plowed the waters of Puget Sound.

In an effort to strengthen ingot inventory, Northwest Steel extended their usual 4 to 5 day winter shutdown for repairs to a full 2 weeks this year. Operations returned to normal in mid-January and the blacklog of ingots built up during the shutdown of the rolling mills is already exhausted.

ALTHOUGH it is of no particular comfort, company officials are well aware that others in the industry are having their troubles. According to spokesmen, practically every mail brings in letters from steel reinforcing bar buyers throughout the world who want help. One of the most recent letters came from a fabricator in Florida who reported that his Birmingham source of bars has told them that they will be able to supply only approximately 48 pct of their demand for the next few years. Apparently the Florida building code, adopted this year, is creating a heavy demand for reinforcing bars.

The local market for reinforcing bars continues to exceed supply from local sources even though much private building has been stopped throughout the area because of scarcity of other materials. The two local producers of bars were unable to meet the full demand for this material on the Hanford and Coulee Basin projects.

Light metal producers are not without their troubles, too. The plan announced by Aluminum Co. of America last November for construction of a new plant to manufacture aluminum rod, wire and electrical transmission cables, remains in the blueprint stage because of the present power shortage.

According to C. S. Thayer, manager of the company's smelting works in Vancouver where the new plant was to be located, they cannot go ahead until they have assurance that they will get continuous power for the new unit and further commitments which will insure power for continuous production of virgin pig at the present level.

The proposed plant would require approximately 4000 kw daily in addition to the heavy demand made at the smelting works. Contract for Bonneville Power for the smelting operation has expired and a new one is being negotiated.

It is interesting to note that one of the important reasons for the power shortage in the Northwest is the heavy demands made by the several primary aluminum producers in this area and that the proposed new plan of Alcoa would make aluminum cable and aluminum wire for electric transmission lines.

It has recently been divulged here that Reynolds Metals Co. is preparing to reopen its primary aluminum production plant at Longview, Wash., in July and is already recruiting labor. This plant was closed down last year because of the power shortage and the backlog of aluminum pig this company had on hand. A new contract has been negotiated which will assure power for this producer after July 1.

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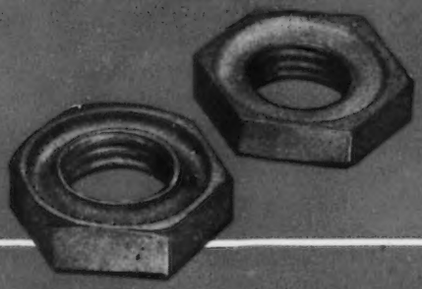
NATIONAL "DRAKE" LOCK NUTS

To withstand severe Stress, Shock or Vibration. Two-piece, positive lock, for use on rugged, heavy equipment, or where thickness and weight are not a factor.

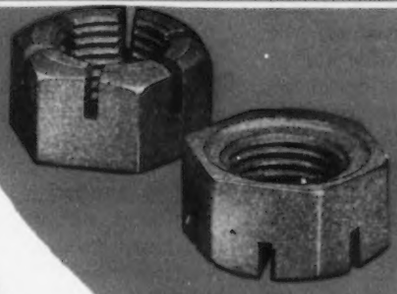


NATIONAL "DYNAMIC" LOCK NUTS

To withstand Shear only. For applications requiring a thin, one-piece, light weight locking nut, and where strains would be in shear only.

NATIONAL "HUGLOCK" NUTS

To withstand Shock-loading or Vibration—even under heat, oil or moisture. One-piece, easily installed, grips the bolt threads and maintains locking effect whether seated or not. Preset torque values, built in, insure vibration-proof results.



NATIONAL "MARSDEN" LOCK NUTS

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Washington . . . .

EUGENE J. HARDY

• Stockpiling program gains momentum but is behind schedule . . . Reverse "aid" good for $142 million annually . . . Herter suggests Americans help expand world production of critical materials.

WASHINGTON—Progress of the nation's stockpiling program can be either encouraging or gloomy, depending on how the observer looks at it.

From the bright side, the Munitions Board recently advised Congress that its current funds, about $91 million as of January 1, will be exhausted by the end of April. This means that despite the many handicaps under which it has been laboring, the Board has stepped up its purchasing rate of raw materials for stockpiling purposes.

A look at the activities of the Board shows that its purchasing has increased from the annual rate of $70 million during the first 6 months of the program to about $235 million during the third half-year period which ended Dec. 31. Believing that this rate can be still further accelerated, the Board has requested Congress to provide it with $285 million for new purchases during the next fiscal year. Even this amount, it hints, may not be enough.

The darker picture is that although the program is gaining momentum, it is still far behind schedule. Authorized nearly 2 years ago, the schedule called for acquisition of $2.1 billion worth of critical and strategic materials. Under Public Law 520, these were to be acquired and stored within a 5-year period—an average purchase rate of $360 million.

By the end of the current fiscal year on June 30, only about $200 million worth of new materials will have been purchased; however, commitments will have been made for another $75 million. In addition, approximately $320 million worth will have been transferred from or will be available from government stocks left over from the war. This brings the total probable acquisitions to $595 million as against a projected $720 million.

NUMEROUS factors have contributed to the slowness with which the program has gotten under way. In neither of the 2 years has Congress appropriated the amounts authorized by law; nor has the Board had the sources of supply even had its available funds been substantially larger.

Congress appropriated only $100 million for the first year but the Board had a tough time spending a little less than $90 million of this amount. In some instances, the materials were not available and in others the price was considered too high. Last year the Board requested and got another $175 million—of which $100 million was in cash and the remaining $75 million in "contract authorizations."

The Board's request for the fiscal year beginning July 1 is for $360 million, the first time it has asked for the full annual rate under the program. Presumably this total will be granted. Out of this sum, $75 million will be used to pay off the contract obligations for the current year, leaving $285 million for new purchases over the 12 months beginning July 1.

On this basis, end of the third year will see stockpile acquisitions increased to about $880 million as compared with the scheduled $1.1 billion when the program was put into effect. In the meantime, prices have gone up, and, on the basis of current price levels, the program will now cost approximately 50 pct more than the original estimate of $2.1 billion.

"At current cost estimates," the Board advises Congress, "the program involves accumulation of approximately $3.1 billion worth of materials. The balance (remaining to be purchased) will cost an estimated $2.7 billion."

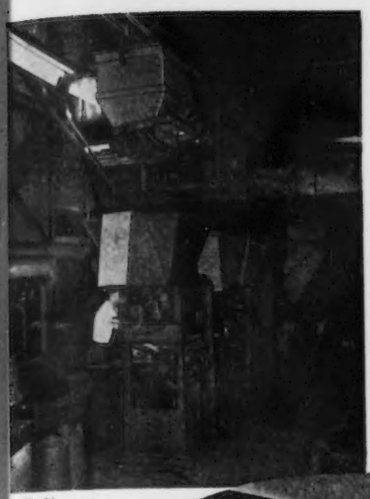
OTHER factors have delayed the program. The Board has obeyed the letter and spirit of the law by being hesitant about going on the open market during present shortages and competing with industry for acquisition of scarce materials. Also, it has stayed out of the market for less critical goods because the prices were considered too high. Civilian economy has drawn heavily upon left-over war stocks.

The Board states that while it has purposely kept its money requests at a low figure, it is accelerating the program and that it expects that either "additional appropriations or contract authorizations will be requested (of Congress) before the end of fiscal year 1949."

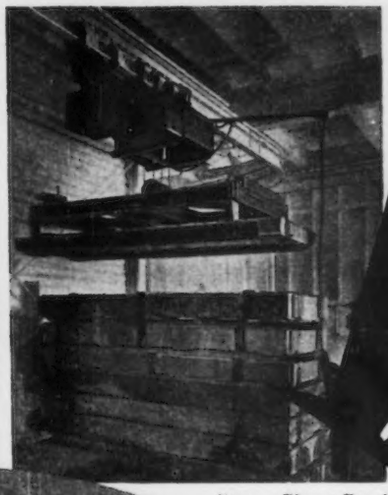
Complicating the problem of stockpiling is the fact that the United States is entirely dependent upon other countries for its supplies of certain items on the "A" list. Also, the domestic consumption of a number of others is so high that not only is the entire American production absorbed but relatively heavy imports are required.

There has been considerable discussion of the mineral resources of the United States. Some point out the virtually exhausted reserves of some items and are forecasting a rapid decline in others. Others refer to the fact that in certain fields the known reserves at any given time have always been limited and urge programs of government support for the mining industry for the purpose of developing new fields.

However, it seems a safe assumption that should the present American production remain at a high

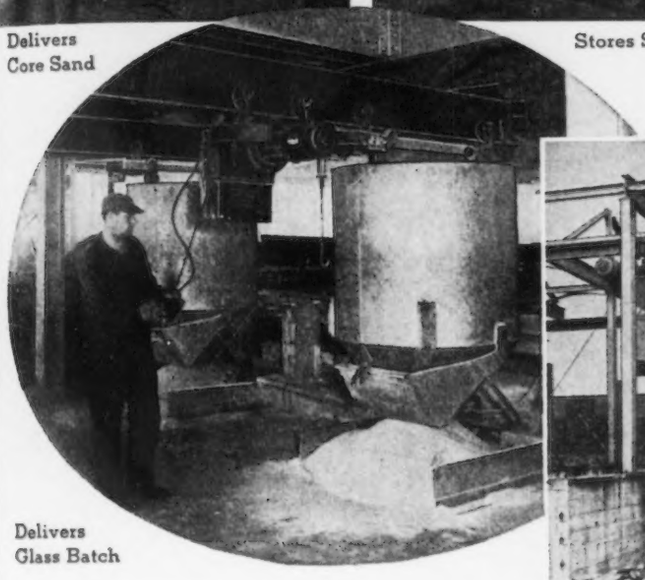


Delivers
Core Sand

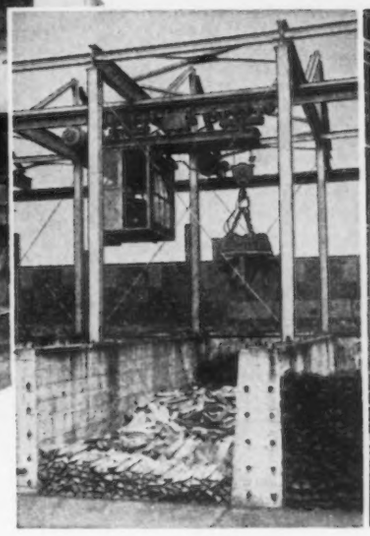


Stores Sheet Steel

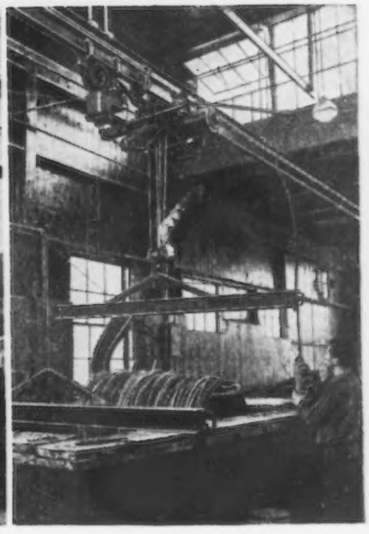
MONOTRACTORS Do the Hard Jobs



Delivers
Glass Batch



Stores Pig Iron



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American MonoTractor units perform automatic overhead handling operations with extreme accuracy and reliability. From unloading raw material to shipping finished products, these automatic carriers save costly handling labor by enabling unskilled help to spot heavy and cumbersome loads accurately and safely. American MonoTractors can be applied to carriers operating on any smooth bottom track. Let an American MonoRail Engineer show you how production goes up, handling costs go down when the hard handling jobs are done with American MonoRail MonoTractors and Systems.

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level, only increased imports will solve the stockpiling problem. For this reason, the Munitions Board is carefully studying various proposals that critical and strategic materials be demanded from Western Europe and its colonies in exchange for help under the Marshall Plan.

THE HARRIMAN report estimated that these sources should be able to supply more than $250 million worth annually. The report of the Herter Committee gives a somewhat more conservative estimate, placing the minimum at around $142 million. But, the Committee said, since production of strategic and critical minerals in Western Europe is less than that area's own needs, the more immediate shipments would have to come from the colonies of these nations.

In this way, the strategic materials could be supplied for stockpiling without reducing the amount now being normally marketed in world commerce, according to the Herter report. This is a factor under consideration by the Munitions Board which also hesitates to advocate any step which might tend to upset dollar credits in any way.

"Therefore," the Herter group proposes, "the ideal arrangement would be for the colonial governments involved to undertake a firm commitment to supply a stated tonnage annually for a period of several years—10 to 20 years being an ideal period for assuring a normal return on capital without either undue profit for the producer or unwise use of scarce equipment for developing and exploiting mining properties."

This, the committee argues, would permit the United States to take such a stated tonnage and the colonial governments in turn could make individual agreements with producers.

"Under present conditions," the Committee warns, "large stockpiles can be accumulated only by expanding world production."

THE committee believes that there is plenty of American capital available and willing to take over or supplement European investments in the colonial areas, provided adequate safeguards are set up. It points out that American capital is already heavily invested in Rhodesian copper, Canadian nickel and aluminum, and in Surinam bauxite; American money is helping develop the lead and zinc fields in Morocco. While it is difficult to measure such proposals, the Committee makes a rough guess that at least $300 million to $400 million in American capital could be found for colonial mining.

This proposal that Americans acquire interests in the mineral rights, providing it is politically expedient, is made because the Committee feels it would upset some of the objectives of the Marshall Plan to channel all critical material imports into the stockpile. By so doing, the current dollar credits which are being earned through normal commercial activities would be reduced and the unfavorable balance further increased.

By acquiring such rights, a combination of American private capital for development under government partial guaranty, plus stockpile deliveries over a 20-25 year period would go far toward repaying some of the Marshall Plan loans.

Nevertheless even without American development aid, it is felt that $142 million worth of "A" list materials could be shipped to America annually without unduly upsetting the applecart. Under the Herter recommendation, the British Empire and possessions would provide $80.3 million worth annually; the French, Belgian and Dutch Empires, $56.8 million; and, all others, $4.9 million.

This figure is conservative, it is admitted; if the materials now seen available were priced at current levels, it is felt that a total of $200 million would be a more nearly correct figure.

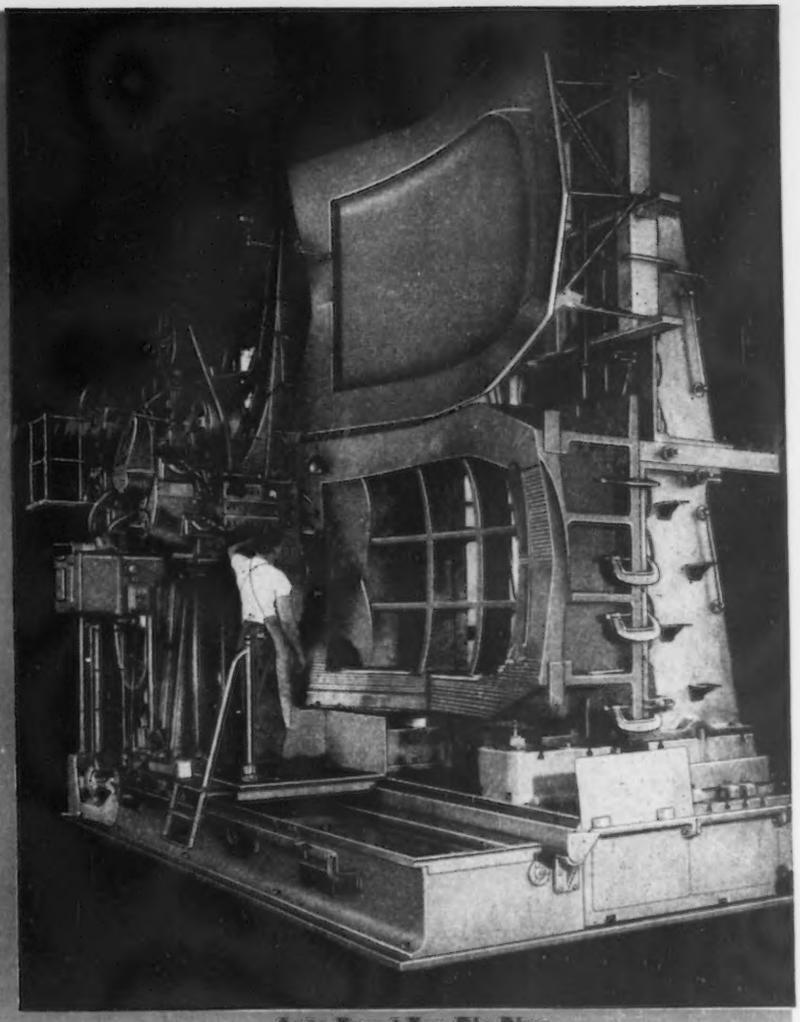
THE BULL OF THE WOODS — BY J. R. WILLIAMS

Czech Steel Output Up

London

• • • **Production of** iron and steel in Czechoslovakia during 1947 was better than that envisaged by the two-year plan. Pig iron production was 1,422,259 metric tons (106.1 pct of plan) and steel, 2,285,271 tons (103.9 pct). 1937 output was 1,675,100 and 2,301,400 tons, respectively. As compared to 1946, the production of pig iron has been increased by 48 pct, while still 15 pct below that of 1937. The production of raw steel is 36.3 pct higher than in 1946, and something less than 1 pct below that of 1937.

BIG DIES



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PERSONALS

JAMES F. SIMPSON, vice-president, International Derrick & Equipment Co.

• **James F. Simpson,** for the past 4 years assistant secretary of Dresser Industries, Inc., has been made vice-president, International Derrick & Equipment Co., a Dresser subsidiary. Mr. Simpson will make Dallas his headquarters.

• **Russell L. Peters** has been elected a director of the Inland Steel Co., Chicago, succeeding the late **Joseph T. Ryerson.** Mr. Peters has been treasurer of the company since 1945.

• **William A. Fowler,** general manager of the Columbus, Ohio plant of the Timken Roller Bearing Co., has retired. **L. D. Gable,** factory manager of the Columbus plant for the past 3 years, becomes general manager.

• **William F. Riley** has become associated with the sales division of Luria Bros. Co., Inc., Philadelphia. He was formerly connected with the James Flett Organization.

• **C. B. Lang** has been appointed president of the Dominion Steel & Coal Corp. Ltd., Montreal, Canada, succeeding **Arthur Cross,** who becomes chairman of the board.

• **O. A. Scudder,** president, and **B. N. Brown,** secretary-treasurer of Midland Structural Steel Co., Cicero, Ill., have retired. New officers are **Charles F. Jarrard,** president; **William Nemec,** secretary-treasurer, and **O. C. Robbins,** vice-president.

o o o

• **Giles R. Locke** has been appointed assistant to the vice-president in charge of operations, Republic Steel Corp., Cleveland. He came to Republic in 1935 as special representative of tubular products, which position he held until his current appointment.

• **J. W. Reed,** Atlantic Coast manager of gas engine and compressor division; **A. A. Burrell,** southwestern district manager; and **B. L. Potter,** midcontinent manager, have been promoted to vice-presidents of the Cooper-Bessemer Corp., Mount Vernon, Ohio.

• **Charles H. Vincent,** engineering consultant and former manager of the proving grounds, Packard Motor Car Co., Detroit, has resigned.

• **Walter E. Remmers** has been elected president of Electro Metallurgical Co., New York. Mr. Remmers also has been elected president of Electro Metallurgical Co. of Canada, Ltd., and other associated metallurgical units of Union Carbide & Carbon Corp. He has been vice-president and director of Electro Metallurgical Co. since 1945 and has been associated with various metallurgical units of Union Carbide & Carbon since 1936.

WALTER E. REMMERS, president, Electro Metallurgical Co.

F. L. MEACHAM, vice-president and general manager, Chicago Vitreous Enamel Product Co.

• **F. L. Meacham** has been elected vice-president and general manager of Chicago Vitreous Enamel Product Co., Cicero, Ill. He has been manager, sales and service, for Chicago Vit since 1943. He had formerly been a research chemist and metallurgical assistant at the American Rolling Mill Co., Middletown, Ohio, and spent 16 years with the frigidaire division of General Motors Corp.

• **Daniel D. Strohmeier** has been named to succeed the late W. H. Collins as vice-president in charge of the Bethlehem Steel Co.'s shipbuilding division. Mr. Strohmeier has been assistant to vice-president since 1942, with offices in New York. His entire business career has been with the shipbuilding division of Bethlehem.

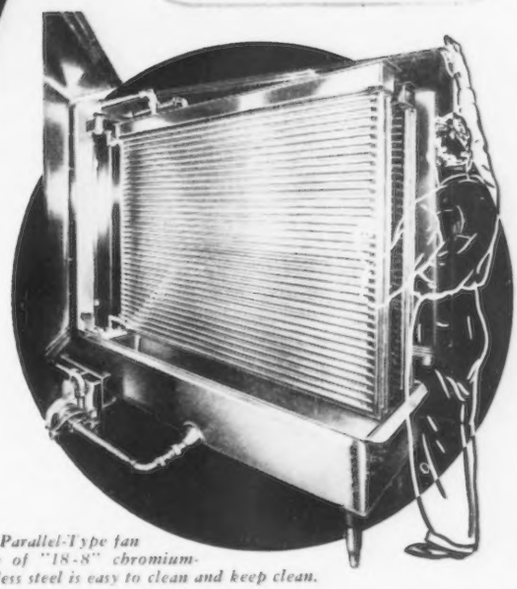
• **Theodore I. Leston** has been appointed vice-president in charge of production, Eutectic Welding Alloys Corp., New York. He was assigned to company projects in the research laboratories at the beginning of 1944, and became director of production in 1947.

• **Lamar Hardy,** former U. S. attorney for the southern district of New York and former corporation counsel for the City of New York, has been elected a director of International Business Machines Corp., New York, succeeding **John L. Stainton,** resigned. Mr. Hardy is a member of the law firm of Davies, Auerbach, Cornell & Hardy.

When Product Purity is Essential

..take a tip from Dairymen

The above 300 gallon Vacuum "A & G" Buttermilk Machine used in a Baltimore, Md. creamery was fabricated from "18-8" chromium-Nickel stainless steel by Jensen Machinery Co., Inc.



This Jensen Parallel-Type fan cooler made of "18-8" chromium-Nickel stainless steel is easy to clean and keep clean.

Even the *least* contamination by bacteria spells D-A-N-G-E-R to processors of milk.

The faintest contamination from products of corrosion may affect the taste.

And that's why chromium Nickel austenitic stainless steel is used for so many pasteurizers, storage tanks, surface coolers, piping and other units for the dairy products industry.

Easy to keep hygienically clean, standard "18-8" stainless is highly resistant to foodstuffs, atmosphere, most organic and a great many inorganic chemicals, and to dyes and sterilizing solutions.

In addition, for many applications in various fields where resistance to corrosion, impact, wear and abrasion are required, "18-8" permits cutting bulk and dead weight without sacrificing strength or durability. Its great resistance to both high and low temperature effects is especially valuable.

Leading steel companies produce stainless steel containing Nickel in sheet, strip, bar and tubular form. A list of the sources of supply will be furnished on request.

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TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, copper-base and other alloys containing Nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

EDGAR H. KRAINER, chief engineer, U. S. Broach Co.

• **Edgar H. Krainer** has been appointed chief engineer of the U. S. Broach Co., Detroit. Before joining U. S. Broach Co. he was associated for 12 years with the Oil-Gear Co. of Milwaukee.

• **Russell B. Kulp,** who entered the service of the Tennessee Coal, Iron & R.R. Co., Birmingham, in 1917, has been appointed superintendent of construction. Mr. Kulp succeeds **M. P. Mellon,** retiring. **Joseph J. McElligott** has been named assistant superintendent of construction, taking over the duties of **C. C. Kelley,** also retiring. **O. E. Dagnan, E. Vance** and **R. E. Meade** have been promoted to construction engineers.

• **Eugene W. Stetson, Jr.** has been elected a director of the Yale & Towne Mfg. Co., New York. He is assistant vice-president of the Chemical Bank & Trust Co.

• **A. J. Prentice,** who has been secretary and treasurer of the Micromatic Hone Corp., Detroit, since 1931, has resigned the position of secretary, but retains the position of treasurer. **Gerald Carlisle** has been appointed secretary and assistant treasurer. Mr. Carlisle has been with Micromatic since 1942 as controller and assistant treasurer. **Farrel B. Weber** has been named to the position of sales manager. He has had previous sales experience with Westinghouse Electric Corp. and has been with Micromatic since 1945.

• **Charles J. Sauter** and **W. Paul Moorhead** have been appointed district agents for Worcester Pressed Steel Co., Worcester, Mass. Mr. Sauter takes over the New York and northern New Jersey territory with headquarters in New York. He has been associated with Worcester Pressed Steel since 1945 as assistant sales manager and advertising manager. Mr. Moorhead represents the company in northern New England with headquarters at the company plant. He served with the Air Forces during the war and later worked in the sales department of Worcester Pressed Steel. **George E. Gates,** formerly traffic manager of the company, has been appointed assistant sales manager, and **Clifton Swanberg,** formerly shipping foreman, takes over the duties of traffic manager. **James G. Walker** has been appointed assistant superintendent of Worcester Pressed Steel. He comes to the company from Consolidated Vultee Aircraft Corp.

• **George W. Strahan,** formerly of the International Nickel Co., has been appointed sales manager of Westlectric Castings, Inc., Los Angeles.

• **E. B. Maire** has been appointed sales manager of midwestern, southern and eastern branch offices of General Controls Co., Glendale, Calif. He was formerly regional sales manager.

• **Abraham Rubin** has been made a director of Apex Smelting Co., Chicago, and has been appointed general manager of the Apex Cleveland plant. **Robert Beck** has been made a member of the board of directors and also eastern sales manager. **Walter Bonsack** has been appointed director of laboratories and research for Apex, and **Eugene Hervey** has been made chief engineer. **G. J. Segal** has been named advertising and public relations manager. These men had been with National Smelting Co. when Apex took over operations in January.

• **W. D. Singleton** has been appointed manager of Ford Motor Co.'s Chester, Pa., assembly plant. Mr. Singleton joined the Ford organization at Dallas in 1931 as a maintenance helper.

RALPH F. COOPER, chief engineer, Patterson Foundry & Machine Co.

• **Ralph F. Cooper** has been appointed chief engineer of the Patterson Foundry & Machine Co., East Liverpool, Ohio. He will be in charge of all the company's mechanical engineering, both in the plant and in the field. Mr. Cooper began his career in mechanical and electrical work in 1922 at the Miller Rubber Co. He was associated with that organization and with Goodyear Tire & Rubber Co. for many years.

• **Richard H. Diesel** has been appointed assistant general sales manager of the Stamford Div. of Yale & Towne Mfg. Co., Stamford, Conn. Mr. Diesel had been since 1945, Yale & Towne's manager of aircraft and automotive sales, with headquarters in Detroit.

• **John P. Mansfield** has been named general manager of the new Dodge Bros. Corp., San Leandro, Calif., plant which is scheduled to begin operation within the next few months. Mr. Mansfield joined Dodge in 1932 and in 1947 he was placed in charge of building and equipping the Dodge San Leandro plant.

• **Kenneth M. Smith,** who has been vice-president and a director of American Steel & Pump Corp., New York, since its organization, has retired as an officer and director of the corporation. He will, however, remain as a consultant to the corporation and its subsidiaries.

FREDERICK W. RYS, assistant works manager, Firth Sterling Steel & Carbide Corp.

• **Frederick W. Rys** has been named assistant works manager of the Firth Sterling Steel & Carbide Corp., Pittsburgh. He has been with Firth Sterling since 1940, and served as superintendent of melting since 1946.

• **Clair W. Daniels** has been elected assistant secretary of the H. C. Frick Coke Co. and U. S. Coal & Coke Co., Pittsburgh. He joined the H. C. Frick Coke Co. in 1937 as a stenographer in the office of the president. After several promotions he was made senior clerk, office of secretary and general attorney in 1947, the position he held at the time of his present appointment.

• **Robert S. Hayes** and **Carl W. Martin** have been advanced to key operating positions at the East Works plant of the American Rolling Mill Co., Middletown, Ohio. Mr. Hayes has become superintendent of the maintenance department. His first connection with the company came in 1912. Mr. Martin has been appointed superintendent of the cold strip mill. He joined Armco in 1913.

• **Louis Siegel** has been made manager of the aluminum division of Levinson Steel Sales Co., Pittsburgh. Mr. Siegel, formerly associated with Schwartz Bros. of Youngstown, has been a member of the Levinson sales staff for a year and a half.

• **John P. Scasserra,** who has been manager of Abarry Steel Co., Perth Amboy, N. J., for the past 3 years, and prior to that was purchasing agent of the company, has been appointed general manager. **Creston E. Kite,** who recently resigned as vice-president in charge of sales of General Alloys Co., Boston, has become general sales manager of Abarry Steel.

• **Dr. G. V. Slottman,** formerly manager, technical sales division, has been appointed technical assistant to the vice-president of Air Reduction Sales Co., New York. **Scott D. Baumer,** formerly assistant manager, technical sales division, has been appointed manager of that division and **Edward H. Roper** has been appointed assistant manager. Mr. Roper has been assistant to the manager, technical sales division, since 1946.

• **Harry J. Palmer** has been made office manager of the Pittsburgh Steel Co., New York sales office. Mr. Palmer was formery with Carnegie-Illinois Steel Co., New York sales office for 12 years, and served 2½ years in the U. S. Navy. Prior to entering the war he was employed in the Iron & Steel Branch of the Office of Price Administration. He joined Pittsburgh Steel Co. in 1947.

• **Frank M. Mason** has been named vice-president in charge of the Atlantic plant, U. S. Electrical Motors, Inc. Mr. Mason will have his headquarters at the U. S. Motors' plant at Milford, Conn. He started with the company in 1930.

• **R. F. Doolittle** has been elected vice-president, legal; **Frank B. Powers,** assistant vice-president, engineering; **R. B. Crean,** assistant vice-president, production; **R. N. Watt,** assistant vice-president, domestic sales, and **C. A. Campbell,** assistant vice-president, foreign sales, of the Baldwin Locomotive Works, Philadelphia.

• **Ernest H. Hawkins** has retired as director of purchases of the E. I. du Pont de Nemours & Co., Wilmington, Del., and **Thomas W. Harris, Jr.,** has been appointed to succeed him. Mr. Harris has been purchasing agent since 1945.

C. L. AUSTIN, executive vice-president and treasurer, Jones & Laughlin Steel Corp.

• **C. L. Austin,** vice-president and treasurer, Jones & Laughlin Steel Corp., Pittsburgh, has been elected executive vice-president and treasurer. Mr. Austin joined the J&L organization in 1942 as treasurer and director and was elected vice-president and member of the executive committee in 1947.

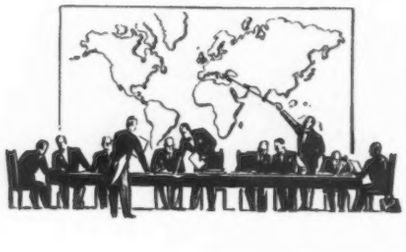
• **R. L. Lefevre,** formerly manager of the Washington branch sales office for 10 years, has become head of the sales department of the General Electric X-Ray Corp., Milwaukee. **W. D. Crelley,** who was manager of the advertising and sales promotion department for 3 years, is now head of the new merchandising department. **G. W. Happe,** a 32-year man with GE, who was formerly assistant to the vice-president in charge of sales, has been named manager of the newly-created products department. **L. L. Ludwigsen,** an 18-year man with GE X-Ray, who was manager of the merchandise department, is head of the newly-created services department.

• **W. J. Vossbrinck** has become associated with the Cleco Div. of the Reed Roller Bit Co., Houston, as sales manager.

(CONTINUED ON PAGE 116)

European Letter . . .

• France remains member of IMF despite protest against devaluation of franc . . . Government's chief objective is stabilization of French economy . . . Britain fears for sterling stability.



LONDON—The French Minister of Finance has announced the long-expected devaluation of the franc. As had been feared, it was not a straightforward devaluation within the framework of the Bretton Woods agreements but involved the adoption of multiple currency practices specifically forbidden to members of the International Monetary Fund unless applied with its consent.

Under the new devaluation the official par value of the French franc has been reduced by 44.444 pct. As a result, the new official dollar parity is 214.392 francs compared with the previous figure of 119.107 francs, and the corresponding official sterling rate has been raised from 480 to 864 francs. There was, in principle, no criticism of this aspect of the plan.

What aroused such keen opposition, both internally and externally, was the simultaneous decision to introduce, as an integral part of the whole scheme, a free market for gold and certain convertible currencies—to be restricted at first to U. S. dollars and Portuguese escudos. French exporters will be permitted to sell in this market one half of the dollar or escudo proceeds of their sales, the other half being sold to the French monetary authorities at the official rate. Only importers of nonessential commodities will be authorized to buy convertible currencies in the free market and their dealings will have to be conducted through an authorized French bank and will have to be covered by the necessary import licenses. Imports of essential commodities will, for the most part, still be handled by the French government and will be transacted at the official rate of exchange.

Indeed, for certain bulk imports the government will continue to use the parities which existed before devaluation, but this decision has a mere accounting significance. The free market will also handle exchange arising from certain "invisible" exports, including sales of dollars and other permitted convertible currencies by tourists. Finally, the free market will be open to receive without question any sales of gold and specified hard currencies which French hoarders may unload.

THIS two-decker devaluation of the franc, with its establishment of a free market in which specified currencies will be allowed to find their own level, and which will therefore produce foreign currency equivalents that may bear no relation to the parities notified to and agreed by the International Monetary Fund, has been strongly opposed by Britain and rejected by the International Monetary Fund. The French government, however, was unmoved by this opposition and was prepared to pursue its objective even if that involved withdrawal from membership of the Fund. In fact, France will continue to be a member, although it has undertaken not to exercise its rights to draw on its Fund quota for the time being.

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The reasons that prompted this determination on the part of the French government must presumably have had a strength appropriate to what was at stake in endangering Western European economic collaboration and risking expulsion from the IMF. The reasons so far disclosed, however, do not quite suggest such weight and urgency.

Reports from Paris have emphasized the desperate nature of the French gold and dollar reserve position and make it appear that one of the main immediate objectives in establishing a free market for dollars and gold is to remedy this situation by encouraging sales from French hoards, which have been estimated at up to $3200 million.

WHEN they were fully acquainted with this case for a free market, the British government and the International Monetary Fund felt bound to oppose it, although they sympathized with the devaluation of the official rate to a new parity. M. Gutt, in a statement issued by the International Monetary Fund in Washington, agreed with the French government that a change in the par value of the franc was necessary, and indicated that the Fund was "prepared to concur in the devaluation of the franc to a realistic rate which would be applicable to transactions in currencies of all members of the Fund."

In London the desire to see the franc devalued to a realistic rate —and even to a somewhat undervalued rate, if that were thought to help French interests—has been no less strongly held and expressed. But to accept a free market would condone an undermining of the whole Bretton Woods philosophy, which is based on the doctrine that members shall work to create monetary stability and shall abstain from multiple currency practices.

The British attitude on this issue is based on considerations both of general and of particular interest. It fears, in the first place, the danger of contagion from the French move, causing an extension of multiple practices and of an added impetus towards competitive exchange depreciation. This is the most serious ground for concern, in general European terms, about the effects of France's devaluation.

As Sir Stafford Cripps ex-

plained, the British government feared the possible effect upon Western European economic and political cooperation and stability that might be brought about by the French proposals. It was this fear which induced him and his imposing retinue of experts to fly to Paris recently to try to persuade the French government at the eleventh hour to think again.

BUT apart from these questions of general stability there are some specific British interests at stake. It is evident that the creation of a free market in Paris will lead to "cross rates" in which sterling will find itself quoted at a discount on its official parity against the convertible currencies quoted in the free market. The original French intention was to allow quotations for all foreign currencies in the free market, but in deference to the wishes of other countries and particularly to those of Britain, the free market quotation has been restricted for the time being to dollars and escudos. Even so, the free market provides the basis for calculating cross rates between sterling and other currencies, and they might be far less flattering to sterling than an open quotation for sterling on the free market.

The psychological effects of the discounts at which sterling will be quoted may be serious. It is one thing to have sterling quoted at a discount in a market for bank notes which rests on a "double-smuggle," or in a market for blocked sterling available only for reinvestment in sterling securities. But it is quite another thing for this discount to arise from commercial rates which result from the transaction of a substantial volume of trade. Inevitably, other countries will look at the sterling cross rate and take it as a reflection of the true value of sterling against the dollar, and by doing so they will tend to undermine confidence in the official rate for sterling.

It remains to be seen whether views thus formulated about the future of sterling will be outweighed, in the minds of people abroad, by protestations such as those of the Chancellor of the Exchequer. He asserted in the House of Commons that Britain does not contemplate taking any action to alter the rate of sterling in relation to other currencies, as we do not believe that this will be rendered necessary or advisable."

THERE is every reason to accept this statement as an unequivocal declaration of intentions. Whatever the ultimate fate of sterling may be, all the arguments at present are against any change, and the direct consequences of France's action do not alter the position.

But when that is said, the psychological influence of an important free market in Paris may acquire direct practical significance if it causes nonsterling countries, with which Britain has to negotiate payments and monetary agreements, to be less willing than they otherwise would be to hold sterling balances. The French initiative, therefore, might in due course create serious handicaps to the increasing use of sterling in financing multilateral trade in Europe.

Apart from this psychological factor, the existence of differential rates in Paris is bound to cause far greater temptations for contravention of French and other exchange control regulations. Indeed, some of the disadvantages to Britain may proceed from perfectly legal transactions. Under the new ordinance there will, for example, be a constant temptation for French merchants and manufacturers to over-import materials for which they pay in sterling at the official rate in order to re-export the surplus to hard currency countries whose convertible currencies they will, in part, be able to sell at inflated prices in the free market.

To Britain, any development of a French entrepôt trade of this kind would mean the direct loss of hard currency income, since re-exports by France would tend to replace direct exports from the sterling area to the hard currency countries concerned. Admittedly, this risk can be safeguarded by a further tightening up of export licenses and by restricting the flow of trade from sterling currency areas to France's essential home requirements. But this adds another important item to the tally of regret about the French decision.

Finally, although sterling will not be quoted in the free market in France, can it be doubted that the toleration of that free market will encourage the development of black markets in all the nonspecified currencies, including sterling? It should, of course, be possible to prevent leakages by the effective control over sterling held in French accounts.

But it must not be forgotten that the area of control is extremely wide, for it includes the whole of the French monetary area and the whole of the sterling area. It is at the peripheries of these areas that leakages may tend to occur, both in financial and commericial transactions; it follows, therefore, that the necessary task of tightening up the machinery of control will be formidable.

THE test of the French case rests on the future—and it is likely to be the very near future. It remains to be seen how far the free market will attract dishoarded gold and dollars, or, conversely, how far the rates which will be quoted in that market will further undermine confidence in the franc and redouble the tenacity with which French hoarders have clung to their dollars and gold. Again, how far will the French economy succeed in sheltering itself from the repercussions of both the official and the "upper deck" devaluation and in preventing prices, wages and costs from overtaking the advantages of currency depreciation? If these objectives can be satisfactorily reached, France's monetary policy may prove justified. But there is ample ground for doubt on both scores.

No discussion of this tense episode in the monetary relations of France with her neighbors and with the International Monetary Fund can ignore the friendly spirit in which the negotiations were conducted and in which the agreement to differ was reached. France remains a member of the Fund and is pledged to use the chosen devices only as a short-term make-shift. The ultimate objective is still to return to a single official rate. Nor do these events mean that France has drawn aside from the Western European nations.

Industrial News Summary...

- **Steel Market Continues Strong**
- **Shortages Seen for Some Time**
- **Truck Hauls in Steel Gaining**

THE drastic slump in the commodity markets has had no effect whatsoever on the iron and steel market. Nor is it expected to have any adverse reaction. At the very time commodity prices were tumbling, steel demand was increasing, output had contracted due to cold weather and material shortages, and substantial purchases of steel scrap were made at the going price.

This week the steel scarcity problem is almost as bad as it was a year ago. Steel customers are again faced with a drop in their steel quotas for the second quarter—even before any concrete plans have been made for the special allocation of steel to so-called essential groups. This tightness in supplies would be increased by further drastic cuts if the nation should face a coal mine shutdown on Apr. 1.

Because of dwindling coal reserves, brought about by extreme cold weather conditions, the steel industry is in no condition to withstand even a short-lived coal mine shutdown. Within 2 to 3 weeks following such a disastrous strike several of the more important steel companies would be forced to cut back steel operations as much as 50 pct. Whether or not this may be necessary remains to be seen, but steel officials are unhappy about the outlook. Coal mine strikes have a way of occurring in the face of even extreme governmental pressure.

Major factors which are expected to keep the basic steel industry in a sellers' market for some time to come are:

(1) Overall steel demand continues high with no weak spots apparent. Flat-rolled requirements are heavier than ever.

(2) Steel inventories are small compared with production and consumption. No large steel consumer has enough inventory to be considered dangerous.

(3) Hundreds of steel customers who have appeared on the scene since war days have no direct source of supply and will continue to lean heavily on gray markets and conversion setups.

(4) Freight car requirements, oil industry and farm implement demands are extremely heavy, so much so that the government will soon take action to step up the supply of steel for these consuming groups. This action will tighten supplies further for other steel customers.

(5) The full effects of the Marshall Plan will not be felt for several months. Added to this is the general export demand which is held in check only by the inability of American mills to take care of the domestic market.

ALL of these bullish influences on the steel market are presently being held in check by cold weather, scrap shortages, insufficient pig iron and the growing spectre of an iron ore shortage. Steel officials this week were certainly in the midst of production problems every bit as serious as during the war. Proof of this was found in a further drop in steel ingot production to 93 pct of rated capacity, down 1 point from last week.

While it has not hit landslide proportions by any means, shipment of steel by truck in order to get around freight rate advances is on the increase. Horizontal percentage boosts in railroad freight rates have caused many steel mills to concentrate on sales close to home. Truck rates are lower on most short trips.

A Pittsburgh producer can shoot 20 tons of sheets into Detroit on an overnight run in two trucks. He saves $2.40 a ton on freight charges and loading over a rail haul. He absorbs only $3 a ton instead of $5.40 a ton to meet competition in Detroit. Also, the customer has his steel several days sooner.

The bulk of steel will probably always be hauled by the railroads but the trend to trucking has increased substantially. A further increase in railroad rates would give it another big boost. In some areas trucks are hauling as much as 20 pct of steel shipped to customers within 300 miles of the producing mill. More steel mill traffic men are watching this situation closely.

Scrap was easier to obtain this week at prices which steel mills seem willing to pay. This is an about-face over conditions prevalent a few months ago. Scrap consumers were playing up the idea this week that scrap prices might drop in sympathy with the commodity price break. It will probably be no more than talk. The long term position on scrap is unchanged and the demand for steel is such as to support a high operating rate for some time to come.

Large tonnages of heavy melting steel were purchased at Pittsburgh and Chicago last week at the so-called formula price—a level which some major scrap users insist they will not exceed. At Philadelphia the average price declined $1 a ton. THE IRON AGE scrap price composite, because of this change, is down 33¢ a gross ton to $40.50 a gross ton.

In recent weeks two midwestern mills, which had withdrawn from the Philadelphia market because of freight absorption, were back looking things over. This scrutiny is now resulting in the sale of products in the Philadelphia area from these distant mills. It may be a straw in the wind that steel companies in at least some cases are finding that their withdrawals have been too severe from a customer relations standpoint.

• **ARGENTINE PIPE MILL**—After arranging a conversion deal on an international level last summer for seamless pipe, Argentina is now preparing to build a mill of its own. In the original arrangement billets from a small steel firm in the Pittsburgh district were shipped to the Dalmine tube company just outside Milan, Italy. The original contract, for 35,000 tons of billets, has been completed, and negotiations are under way for an additional 5000 tons. The Italian company, which arranged the deal, will also lay the pipe. Machinery orders for the seamless mill to be built in South America are now being placed in this country.

• **TRADE AGREEMENT**—The trade agreement which Czechoslovakia concluded with Russia late in 1947 is stated to have secured long term orders for Czechoslovakia's heavy industries which will be spread over a period of 5 years. Overall quotas, together with annual delivery specifications, have been fixed, and iron and steel products, especially tubes, machinery and equipment, are important items on the list. It is expected that deliveries under the various sections of the agreement will amount to about 17 pct of Czechoslovakia's total exports during the current year.

• **ORE TRANSPORT**—Authority for Canadian vessels to operate between U. S. ore ports is due for renewal in the House. The Senate already has passed a bill (SJ Res 172) extending until Jan. 1, 1949, the wartime authority for vessels of Canadian registry to move freight between U. S. ports. Extension of the measure drew unanimous support in the Senate when it was pointed out that more iron ore is due to be moved through the Great Lakes in 1948 than in 1947. From 1920 until World War II, Congress required movement of water freight between U. S. ports in vessels of American registry only.

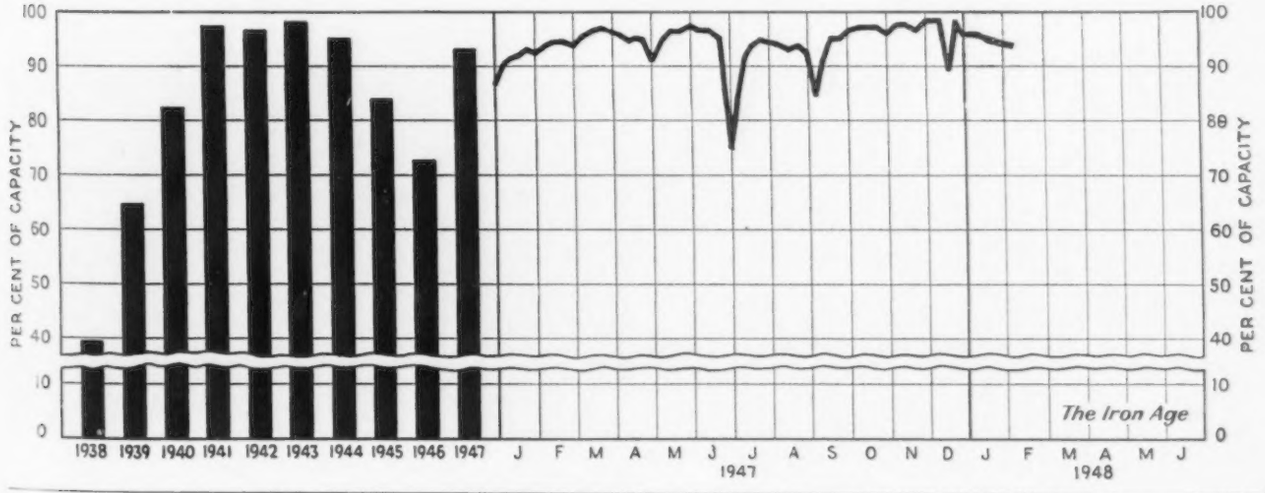
• **TARIFF WALL**—During December, the first full month of the Canadian government's program of banning and regulating imports from the U. S., exports from this country to Canada were $33 million below the previous month. The import restrictions, imposed Nov. 17, were designed to conserve the dominion's dwindling dollars.

• **MOBILE LABOR**—While experts were declaring the nation's job boom ended, a plane carrying 26 Puerto Ricans hired to work at the National Tube Co. in Lorain, Ohio, landed at Cleveland. The men were flown in by the S. G. Friedman Farm Labor Agency, Philadelphia. Mr. Friedman, who was on hand to greet the men at the Cleveland airport, said some 200 Puerto Ricans had come to National Tube since last November.

• **CONSTRUCTION**—January construction is estimated at $1.1 billion by the Commerce Dept. on the basis of preliminary figures. Privately financed building amounted to $899 million while public construction approximated $207 million. A drop of 6 pct over December was less than the normal season decline and was up 32 pct over January, 1947. Private residential construction for the month totaled $510 million; industrial, $130 million; public utility, $100 million; and, farm construction, $13 million.

• **CANTERBURY SCRAP**—The first boatload of the notorious Canterbury Corp. scrap from Germany that was shipped to Italy for processing is now on its way to the U. S. Through the medium of a loosely written U. S. government contract, Italians drew the conclusion that this scrap, or most of it, was to go to Italian steel plants. The U. S. government stepped in to effectively void the contract and ensure that the scrap goes to the U. S. Some opinion in Italy is that after the hulabaloo is over, they still may wangle some of the material.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
February 3	95.0	92.5	92.0*	88.0	95.0*	96.0	96.0	102.0	100.0*	95.0	102.0	78.0	87.0	94.0
February 10	93.0	92.0	92.0	88.0	95.5	99.0	95.0	102.0	101.0	99.0	105.0	78.0	81.0	93.0

* Revised.

Welded Design Cuts Costs 20%, Improves Saleability

By Louis E. Kibler, Engr.
A. K. Robins & Co., Inc.
Baltimore, Md.

THE urgent need for hard-to-get parts used in the conventional construction of the "goosenecks" for our food conveyors prompted us to redesign them to an all welded steel construction. The new design has **netted** us savings of 25% in fabricating **time** and of 20% in material **costs.** (Fig. 1.) Furthermore, the appearance of the finished machine has been enhanced considerably and the weight reduced 92 pounds, improving its saleability.

The original design of "gooseneck" involved an assembly of three separate parts bolted together. (Fig. 2.) The parts had to be milled, drilled and then tapped. The assembly also required careful matching and fitting of each side frame unit before bolting the parts together.

Our new welded design eliminates the need for any jigs or fixtures. In place of the former "gooseneck" component parts, the new design specifies $\frac{3}{16}$" steel plate sheared from stock to any desired angle and size to comprise the side frame sub-unit. The angle iron tracks and guides are welded to the side frame and then notched. The tracks and guides are bent to the required angle to conform with the shape of the steel plate, clamped into position and welded one piece at a time with a Lincoln "Shield-Arc Jr." D.C. welder and "Fleetweld 37" electrode. (Fig. 4.) In the "gooseneck" assembly alone, the weight has been reduced from $67\frac{1}{2}$ to $44\frac{1}{2}$ pounds.

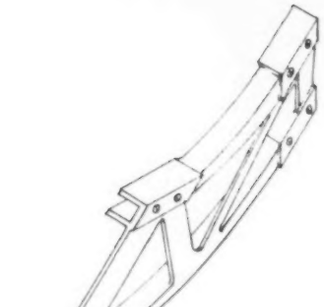


Fig. 2. Original "gooseneck" assembly. Weight $67\frac{1}{2}$ lbs.

Fig. 3. Redesigned "gooseneck" of arc welded parts. Weight $44\frac{1}{2}$ lbs.

An additional sales advantage of the welded conveyor is the fact that we can now match the customer's needs more readily by supplying any size or angle of "gooseneck." In our previous design little change in detail could be accommodated without involving a prohibitive expense.

To gain the same advantages on other sub-units of our conveyor the tanks, frames, drive pulleys and brackets have also been converted to welded design.

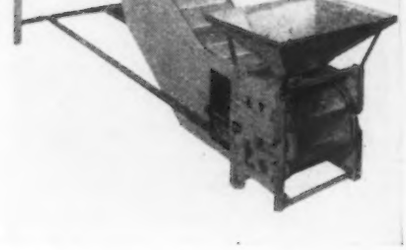


Fig. 1. All welded design food conveyor for the canning industry.

Fig. 4. Arc welding the guides to the side frame plate.

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(Advertisement)

Soaring Rail Freight Rates Foster Rail vs. Truck Comparisons

Traffic Managers Making and Considering Shifts from Railroad Transport

o o o

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

o o o

Pittsburgh

• • • **Soaring railroad** freight rates are forcing many manufacturers of iron and steel and their products to consider increasing truck shipments. Several steel company traffic managers told THE IRON AGE they've either made or are planning to make further switches from rail to truck shipments within a 300-mile radius of Pittsburgh. Others, who say there hasn't yet been much change in their pattern, maintain that another rail rate increase will push them further toward the truck lines. A few others doubt that the future will see much change in their rail-truck shipment pattern.

It is still too soon to say definitely what effect the latest series of rail freight raises will have on shipments of finished iron and steel. Up to date figures are not available but good sources here say there has been a steady increase in truck shipments in recent months. The picture is still a bit "iffy." Some truck lines have raised rates, others are reportedly considering it. But in most cases within a 300 to 350-mile radius the truckload rates will be lower than rail rates.

A 25 pct jump in l.c.l. rail rates on Jan. 31 hit small shippers like a ton of bricks: The l.c.l. rail rate to Detoit went from 58¢ to 72¢ per 100 lb. A 5000-lb load on a truck would take the l.c.l. truck rate (5000-lb minimum) of 54¢ per 100 lb, for a total rate to Detroit of $27. By rail it would cost $36.

The truckload rate (20,000 lb) to Detroit is now about 35¢. This means that a steel company can ship two truckloads, or 20 tons, to Detroit by truck for $140. By rail at the carload rate the charge would be $168. On top of the saving in freight rates by moving via truck, steel traffic men explain that it costs about $20 to block and brace a boxcar shipment. The trucker slings a chain and a tarpaulin over the load and there's no bracing charge.

The accompanying table shows some typical truckload rates from Pittsburgh. Unlike rail rates, truck rates are fixed by individual companies or groups of companies. The rates quoted don't apply to all truck lines, but represent charges which some steel mills are paying on truck shipments from here. Transportation tax is not included in rail or truck rates.

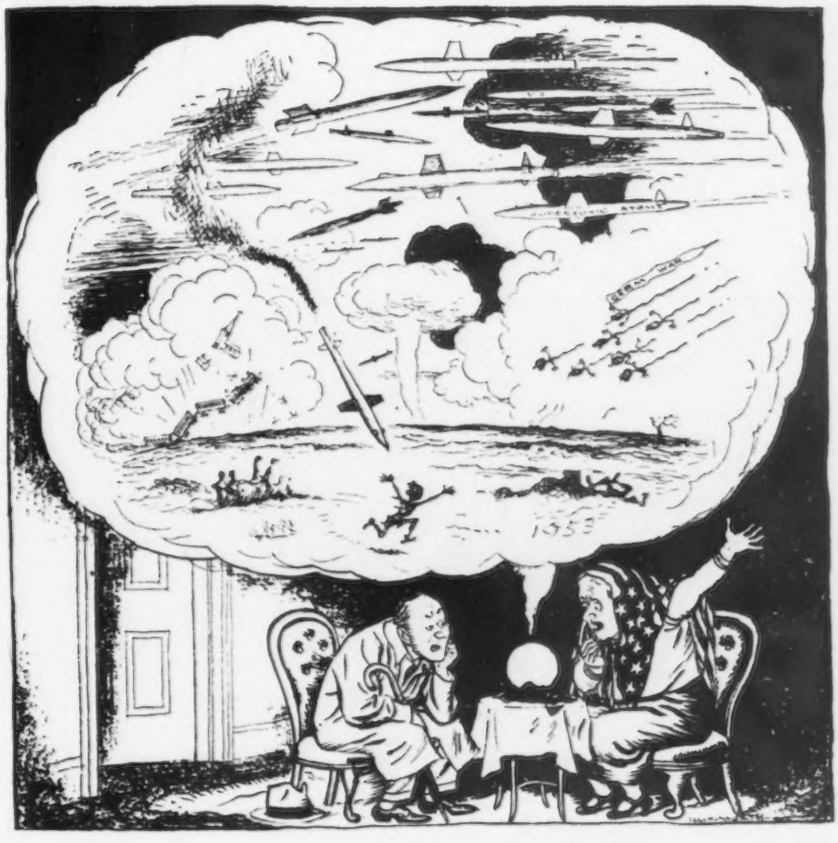
Trucking executives interviewed by THE IRON AGE often did not stress the lower rate as much as what they call their better service. Philadelphia is an overnight truck run from Pittsburgh. The railroad takes about 3 days. It is on small shipments, specialty steels, nuts and bolts and the like, that the truck lines claim a particular edge. It's door to door in a short time. And time is vital in keeping many plants running at present.

But truckers are not making the giant strides these cost figures would indicate. It is often more economical to make large steel shipments to a single consumer by rail. Where geography permits, barge shipments are cheaper than rail hauls. And when a load is small, say 500 lb, the railroad will take it whereas the steel company traffic manager will probably wear out his thumb dialing trucking companies for a commitment.

Most steel plants were originally laid out for economical loading of boxcars or gondolas. Today many —but not all—have installed efficient truck loading platforms. Some steel producers assert they have about reached the limit of the amount of material they can efficiently load by truck.

Another factor in any study of comparative positions is the freight

All right, all right—but when do I get my gas ration back?



Courtesy London Daily Mail

TRUCK v. RAIL RATES

(Iron and steel articles, cents per 100 lb.)

Pittsburgh To	Truckload*	Carload	Differential (cents)
Buffalo	30	37.2	7.2
New York	54	51.6	x
Philadelphia	38	45.6	7.6
Reading, Pa.	38	43.2	5.2
Baltimore	42	43.2	1.2
Wheeling, W. Va.	13	16.8	3.8
Portsmouth, Ohio	32	40.8	8.8
Columbus, Ohio	26	33.6	7.6
Dayton	31	38.4	7.4
Cincinnati	35	42	7
Cleveland	23	28.8	5.8
Toledo	30	37.2	7.2
Youngstown	14	18	4
Chicago	48	52.8	4.8
St. Louis	70	62.4	x
Detroit	35	42	7
Pontiac, Mich.	36	43.2	7.2
Lansing, Mich.	38	45.6	7.6
Ft. Wayne, Ind.	36	43.2	7.2
South Bend, Ind.	40	48	8
Gary	48	52.8	4.8
Indianapolis	40	48	8

* Approx. 20,000 lb

car shortage. No one can estimate how much goods are hauled by truck because of it. But trucking officials say there are not enough trucks in service here to accommodate a sharp spurt in business if it were thrown their way. The fact that trucks can be bought quite readily is beside the point.

In testimony before the Interstate Commerce Commission in 1946, W. E. Fowler, appearing on behalf of 20 steel companies of various sizes, but not U. S. Steel, cited truck and rail shipment data. These companies submitted data for the last 3 months of 1945. On this basis the 1945 shipments of these mills to distances up to 300 miles were about 8 milion tons by rail and 2 million tons by truck. In the first 9 months of 1947 data submitted to the ICC shows that U. S. Steel Corp. subsidiaries moved 6 pct of their total steel shipments by truck.

Each time the railroads made horizontal freight rate increases in the past few years the fences were moved closer to the steel mills. Mill withdrawals from distant markets in the face of higher steelmaking and freight costs are no longer news. It is believed in some traffic circles that this concentration on markets closer to home may increase the percentage of truck shipments. Further, many trucking men believe that they can continue to keep their costs under those of the railroads. If the railroads get the increase they now seek—amounting in effect to another 20 pct boost—they feel certain of it.

FTC Complaint Moves At Snail's Pace As Testimony Drags Out

Washington

• • • **The Federal** Trade Commission's price and capacity complaint against the industry inched along in low gear last week.

FTC attorneys, who earlier had said they planned to conclude preliminary hearings before a trial examiner here this week, now admit that the need for calling additional witnesses to bolster their case may extend the current hearings for "at least another week, and maybe longer."

Testimony relating to identical bids submitted to the Federal government is taking considerably more time than had been anticipated by Lynn Paulson, FTC counsel. Attorneys for the American Iron & Steel Institute and for the industry have raised a number of questions as to the competency of testimony presented by A. B. Custer, of the Navy Dept., and John L. Neeley, of the Tennessee Valley Authority, both procurement specialists for the government.

* * *

Plans to take the commission's inquiry on the road have been temporarily abandoned. Present indications are that it will be late March or April before hearings are definitely scheduled by FTC for such locations as Pittsburgh, Chicago, San Francisco, and New York.

Only a handful of company price lists have been submitted to the commission. These are mostly the lists of smaller companies. Counsel for larger concerns estimate their firms need at least another week to compile all the requested information on prices.

Name Change Up at Armco

Middletown, Ohio

• • • **A proposal to** change the name of The American Rolling Mill Co. to Armco Steel Corp. will be submitted to shareholders for consideration at their annual meeting on Apr. 15, Charles R. Hook, president, announced recently.

Mr. Hook said that the change in name had been under consideration for some time. "The proposed new name utilizes the company's well-known trade name 'Armco,' and at the same time indicates that it is a steel company," he stated.

"As a result of 34 years of continuous advertising, our trade name has become better known than our corporate name. Surveys made during the past several years indicate that a large segment of the public already knows us as 'Armco.' The proposed change should prove a great convenience to customers, employees, shareholders, and the public at large."

Lower Costs Predicted For Fontana Steel Plant

Washington

• • • **A noticeable** reduction in costs of steel production at the Fontana steel plant is expected to be realized soon after mid-April, a spokesman for the Henry J. Kaiser interests said this week. Two factors contribute to this outlook.

A rail spur to the Eagle Mountain Mines, now under construction by Kaiser, is expected to be completed by that time and bring down present cost of transportation now done under trucking contract.

At the same time, the newly acquired blast furnace and facilities at Ironton, Utah, are expected to be placed in operation and further savings realized through shipping metal rather than unprocessed ore from Utah.

Contracts have already been let for reconverting the furnace which was acquired from WAA last week. In addition to the furnace, the sale included a sintering plant and a battery of 500 beehive coke ovens.

Pressed Metal Institute Sees Expanded Flat-Rolled Use

Growth in U. S. Population Is Key Factor in Consumption Pattern in Future

o o o

By WALTER G. PATTON
Detroit Regional Editor

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Toledo

• • • **The** "world's stamping ground"—Toledo—was host this week to 200 members of the Pressed Metal Institute at their first national meeting of 1948. In addition to holding a trustee's meeting, members of the Institute made plant visits to Acklin Stamping Co., Toledo Stamping Co. and the new $5 million press shop of Willys-Overland Co.

Speakers at the luncheon meeting at Willys-Overland included Arthur Wieland, executive vice president of Willys-Overland; D. G. Roos, vice president in charge of engineering; Earl Harpst, Willys' assistant to vice president, and R. W. Glasner, president, Clearing Machine Corp.

Speakers at the dinner meeting were Tom Smith, Jr., president of the institute, and Frank Rising, managing director of Automotive and Aviation Parts, Inc., Detroit. The subject of Mr. Rising's talk was "Politics and Economics."

In his address, Mr. Rising pointed out that many of the efforts in Washington to plan for future consumer demands have fallen short of the mark because of failure to take proper account of the increase in U. S. population during the past two decades, resulting in deficits in housing, schools and many consumer items. Rising asserted that while gross tonnages of products have increased in many categories, production per capita in this country has declined in recent years, actually resulting in a lower standard of living throughout the nation.

Conversations with representatives of stamping companies who came to Toledo for the meeting indicate that steel is still the No. 1 problem of the stamping industry. Most sources indicated that gross tons of products have increased substantially since 1941, the increases in some cases running from 150 to 200 pct. However, due to dislocations in sources of supply most companies have had to scramble for tonnage and it has been largely a matter of individual resourcefulness that their plants have been kept operating.

The case of one stamping company, while it may not be typical, is indicative of what may be happening to many stampers. Before the war, this particular company was receiving 80 to 90 pct of its steel from mill sources. At the present time mill suppliers are furnishing less than 40 pct of the steel required. "Marginal steel" procured from conversion deals is today the largest additional source. To some extent suppliers have fed back steel to this vendor and some additional tonnage has come from warehouses.

In part, withdrawals by steel suppliers from the Toledo area have accounted for much of the lost tonnage here. In the case of one company, two large mill sources have withdrawn. Another supplier has reduced its allocation "substantially."

While most stampers here agree they have been able to obtain steel "by using all available channels," many now fear that the large tonnages heretofore obtained by conversion may not be forthcoming in 1948. Several stampers report their ingot allocations have already been cut. All agree that increased railroad rates, allocations under the Marshall Plan and the possibility of a critical scrap shortage may cut further into their present steel supplies. "Black market prices are going up," one source informed THE IRON AGE, "and further advances in prices of steel furnished by many of these operators may be expected." Other sources pointed out that telephone calls from gray market operators have become more frequent in recent days.

The steel stampers' most persistent complaint is that steel companies have failed to distribute tonnage according to the pre-war pattern and that they have failed to make proper allowance for the increased use of stampings in place of castings, forgings and many products made of wood and other materials. The stamping industry sees ahead a tremendously increased use of flat rolled products for the housing, agriculture and other industries where savings in weight and economies in fabrication have amply demonstrated that steel stampings and weldments offer the best possibility for producing better products at lower cost to the consumer.

SLATED FOR SCRAP: *Britain's far-reaching scrap retrieving program includes the scrapping of four battleships and one battle-cruiser. This is the 32,700-ton Queen Elizabeth, which is 33 years old, with 10 years of war service. Tears fell in Parliament upon the announcement of decision to scrap the ships.*

Basic Refractories Decides to Enter Basic Brick Field

Cleveland

• • • **Facilities** for the manufacture of basic brick are soon to be installed at the Maple Grove, Ohio, plant of Basic Refractories, Inc., Howard P. Eells, president, said this week. The new facilities are expected to be ready for production by the latter part of 1948.

Heretofore the company has concentrated on the manufacture of granular dolomite, magnesia and chrome refractories for furnace maintenance and repair. Basic brick is used in the lining and relining of rotary kilns, industrial furnaces and in basic openhearth and electric steel furnaces.

Howard P. Eells

Basic's brick plant will be the only one of its kind in Ohio and the Midwestern area. The manufacture of basic brick of this type is now largely confined to the Baltimore-Philadelphia area.

The company's decision to expand into the basic brick field stems from more than 20 years of research and development and on experience gained in the continuous operation of a pilot brick plant for approximately 10 years, Mr. Eells said.

Output of the pilot plant was used principally to line the section of its own rotary kilns in which temperatures well above 3000° F are employed.

The product proved more satisfactory for this use than any basic brick commercially available in the United States and led to the decision to enter this field on a commercial basis, according to Mr. Eells.

The manufacture of basic brick on a commercial scale had long been contemplated by Basic Refractories, Inc., Mr. Eells said, and much of the needed equipment for a brick plant had already been purchased prior to the outbreak of World War II. Plans were temporarily abandoned, however, to permit concentration on the company's Las Vegas magnesium project and on the task of increasing granular basic refractory production to meet the war-created demands on the steel industry.

Large scale tests of the brick production of Basic's pilot plant have been made in rotary kilns used to make portland cement and in the hearths of industrial heating furnaces, such as forge furnaces. Up to this time, however, the company's new rotary kilns at its Maple Grove plant have taken the pilot plant's entire production.

A large part of the production of the new plant is expected to be used in the cement industry and by companies employing furnaces for heating steel prior to forging, forming and other preliminary operations.

In addition to the rotary kiln and heating furnace brick, Basic Refractories plans eventually to make a line of basic brick, fired and unfired, for use in the basic open-hearth and basic electric furnace industry.

Economic Development Committee Recommends European Aid Program

Washington

• • • **Research and Policy** Committee of the Committee for Economic Development has endorsed economic cooperation by the U. S. with Western Europe for both relief and reconstruction aid.

Emphasizing that breakdown of a free society abroad would make the maintenance of freedom here more difficult, the statement recommends that appropriations should be authorized for at least a 4 year program. Further it suggests that the program be administered by a single purpose agency directed by a single administrator, appointed by and directly responsible to the President.

Congress should determine the basic policies governing the program, according to the Committee, and should delegate precise powers to the President for execution of these policies. In this connection it is urged that no unnecessary restrictions be placed on the agency responsible for enacting the program.

A minimum condition of aid should be that the European countries involved carry out the commitments they made at the Paris Conference and that these undertakings should be implemented in the specific agreements to be made with each benefiting country.

"The key to the maintenance of free societies and economies is production," the statement declares. "If production can be increased by one third quickly, Western Europe will be on the way to prosperity. All evidence indicates that Western Europe cannot accomplish this increased production without American aid."

The report considers the fact that a program of European aid will contribute to inflationary pressures domestically, but says that "we must face the problem of inflation whether or not there is an aid program, and we should be able to deal with it and still carry on activities vital to our national welfare."

It is recommended that there be a close working relationship between the new agency and the Dept. of State, so that the program will be consistent with the foreign policy of the U. S. It is also urged that Western Germany be made an integral part of the development of Western Europe.

Taylor-Wilson Adds To Staff; Plans Expansion

McKees Rocks, Pa.

• • • **George F. Walker** has been named a director of Taylor-Wilson Mfg. Co., McKees Rocks, Pa., and has assumed the position of vice-president in charge of sales. W. M. McConnell also has been elected a company director and is now vice-president in charge of engineering. This announcement was made recently by Howard M. Wilson, company president.

Mr. Walker recently resigned as manager of machinery sales for Mackintosh-Hemphill Co., Pittsburgh. Mr. McConnell, who was for many years associated with Koppers Co., Inc., and Patterson Foundry & Machine Co. in various engineering capacities, recently resigned as chief engineer of Mackintosh-Hemphill Co.

According to Mr. Wilson, the company plans to enlarge its facilities for the manufacture of both hot and cold rolling mills, and allied equipment. Mr. Wilson also reported that Taylor-Wilson Mfg. Co. has definite plans to enlarge its tube mill facilities.

New Firm Enters Competitive Eastern Cold-Finished Bar Market

Philadelphia

• • • **The competitive** eastern cold-finished bar market was entered by another producer when late last month drawing operations were begun at Camden, N. J., by Precision Drawn Steel Co. Initial operations had been delayed by extended delivery time on machinery and equipment and the plant, as yet, is operating with only a portion of its facilities, but initial shipments left the plant on Dec. 29.

Officials of Precision, well known to the metal industry, expect to be able to carve out a market position in the eastern area centering around Philadelphia and Pennsylvania points as far west as Harrisburg, New Jersey, New York, and as far south as Norfolk, Va. So far the company has done little to seek business but there is some backlog of orders on hand from warehouses and consumers. There are no immediate plans for the company's entry into the export field, according to officials.

Supplies of hot-rolled bars are being received from three producers, and commitments for minimum shipments during 1948 are estimated to be sufficient to carry overhead costs. Already there are some 2000 tons of hot-rolled bars in stock, as deliveries began in October.

The chairman of the new company is Ralph Cornell who heads a structural steel erection firm under his name at Woodbury, N. J. Paul W. Newcomb, president, was until recently sales manager of Keystone Drawn Steel Co. George H. Hulse, vice-president and secretary, was assistant purchasing agent in charge of steel purchases for Philco Corp. Henry J. Bauman, vice-president and general manager set up the Empire Works acquired by Wycoff Steel Co. in 1944. Since then Mr. Bauman has set up and operated the plant of the Westland Drawn Steel Co. at Los Angeles. Officials are reported to hold 74 pct of the company's stock.

Investment in plant and equipment is reported to be well above that originally contemplated and has reached a half million dollars.

Precision Drawn Steel Co. At Camden, N. J., Delivers First Shipments

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By JOHN ANTHONY
Eastern Regional Editor

o o o

There are two Aetna Engineering Co. drawbenches now operating, one drawing up to 1½ in. diam at 25,000 lb force, the other to 3¼ in. diam at 50,000 lb. Drawbench buggies operate at speeds up to 100 fpm, complete control of speed being permitted by use of dc power. A Medart turning machine now operating produces bars from 3 in. to 6 in. diam. Two Vaughn coil blocks will permit the production of drawn stock down to ¼ in. diam.

Straightening and polishing is handled by two Medart machines. There are two straightening and cutting machines for the coil blocks and three Cincinnati centerless grinders.

Tungsten carbide dies are to be used for drawing rounds and hexagons; tool steel dies for squares.

Company officials estimate that maximum annual production should reach 50,000 tons.

At the present time there is excess cold drawing capacity in the eastern market and present producers are seeking additional tonnage. Hot-rolled bars are freely available in sizes of ½ in. and above. Market sources believe that a large proportion of the tonnage taken by Precision will be likely to come out of the business of the Pittsburgh producers of cold-finished material largely on a service and earlier delivery basis.

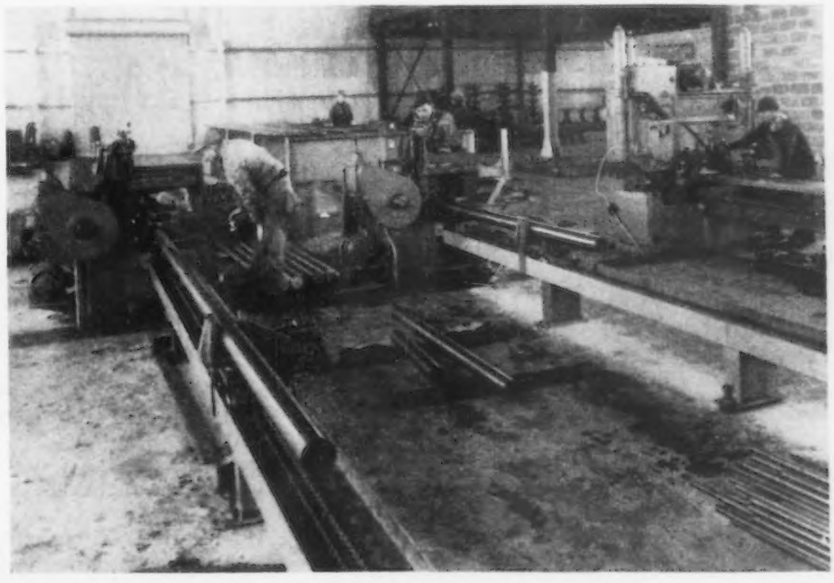
Mullins Net Soars

Warren, Ohio

• • • **Mullins Mfg.** Corp. has reported 1947 net income of $4,973,109 including an adjustment of $178,492 for renegotiation of war contracts and federal income taxes. This compares with net income of $1,084,121 in 1946 when operations were hampered by shortages of steel, railroad cars and natural gas.

Mullins' net sales totaled $37,631,055 or nearly double the $19,937,580 net sales of 1946 and considerably more than $29,770,175 net sales of 1945, which included war contract work.

NEW BAR PRODUCER: *Another entrant into the competitive eastern market is Precision Drawn Steel Co., Camden, N. J. Two Medart straightening and polishing machines and a Marvel hydraulic saw are shown in operation.*



Personals . .

(CONTINUED FROM PAGE 105)

• **William Townsend** has been appointed general sales manager of the Pennsylvania Flexible Metallic Tubing Co., Philadelphia. **Edward Sala** has been named manager of the midwest branch of the company, with headquarters in Chicago.

• **A. M. Johnson** has been elected chairman of the board of the Barnes Drill Co., Rockford, Ill. **W. M. Fairbairn** has been elected president and general manager; **Reed M. Andress,** executive vice-president; **A. G. Block,** vice-president, secretary and treasurer; **Roger Marriott,** vice-president and assistant treasurer, and **Harold Johnson,** vice-president and assistant secretary.

• **Andrew A. VonMelker** has been appointed manager of the Trenton, N. J., works of the Westinghouse Lamp Div. Mr. VonMelker was transferred from Bloomfield to Trenton last July as an executive assistant to Mr. Monk. He is a veteran of almost 32 years' service with the Westinghouse Lamp Div.

• **Lawson Adams,** secretary of Wrought Washer Mfg. Co., Milwaukee, has been promoted to treasurer, succeeding **J. A. Holzer,** retired. Mr. Holzer served as treasurer of Wrought Washer for the past 25 years.

AUGUST R. MAIER (left), director of engineering, and ALEXANDER QUAYLE (right), chief engineer, Oil Well Supply Co.

• **August R. Maier** has been appointed director of engineering and **Alexander Quayle,** chief engineer of Oil Well Supply Co., U. S. Steel subsidiary. Mr. Maier's new headquarters are in Dallas. Mr. Quayle will remain in Oil City, Pa. Mr. Maier became associated with the oil industry in California, and joined Oil Well in 1930 as a development engineer at the company's Wilson-Snyder Mfg. Div. in Braddock, Pa. He was transferred to Dallas as assistant chief engineer in 1932 and was named chief engineer 4 years later. Mr. Quayle's most recent position with Oil Well Supply was assistant chief engineer.

• **Harry Pinkus** has been made western division sales manager of the James Flett Organization with headquarters in Chicago. **James Corbin** has been advanced to sales manager of the eastern division with headquarters in New York, and **Chelson E. Sayer** has been named manager of the Flett office in Cleveland.

• **Theodore F. Nessler** has been appointed to a newly-created position of purchasing manager for the chemical department of the General Electric Co., Pittsfield, Mass. For the past 8 years, he has been in charge of purchasing of chemicals, castings, factory and foundry supplies for GE.

• **Louis E. Keen, Sr.,** president of the Keen Foundry Co., Griffith, Ind., died Jan. 17.

• **Arthur M. Morgan,** former vice-president and director of Latrobe Electric Steel Co., Latrobe, Pa., died recently. He was associated with Latrobe for about 20 years.

• **Morgan R. Kavanagh,** of the Ohio Crankshaft Co., Cleveland, died recently. He came to Ohio Crankshaft in 1944 as factory manager of the company's aircraft subsidiary, Ohio Crankshaft Inc., and at the war's end became factory manager of the company's crankshaft and camshaft divisions.

...OBITUARY...

• **Charles A. Olson,** 67, tool superintendent of the Gisholt Machine Co., Madison, Wis., died Jan. 3.

• **Howard W. Gilbert,** engineering assistant to the president of National Malleable & Steel Castings Co., Cleveland, died Jan. 16.

• **William J. Hamilton,** 80, secretary and a director of the Hendrick Mfg. Co., Carbondale, Pa., died Jan. 27. He had been with the Hendrick company 59 years.

• **Albert H. Chatley,** 55, a vice-president and the general manager of the Delta Mfg. Div. of Rockwell Mfg. Co., Milwaukee, died recently. He had been with Delta for the past 9 years.

• **Arthur M. Morgan,** former manager of the Detroit office of Latrobe Electric Steel Co., died recently. He retired in 1947.

• **Claude I. Auten,** former manager of sales in the cold formed steel division of the Tennessee Coal, Iron & Railroad Co., Birmingham, died Feb. 1. Before becoming associated with the Tennessee company in 1938, Mr. Auten had been a vice-president of Truscon Steel Co.

Industry, College Provide Course In Sales Engineering

Cleveland

• • • **A special summer** refresher course in sales engineering, designed expressly for the machine tool industry, will be conducted by Cornell University, Ithaca, N. Y., in cooperation with the National Machine Tool Builders Assn. and the American Tool Distributors Assn.

The course will be held from July 12 through 23, inclusive, and will be limited to 50 men, selected from the sales managers, district managers and sales engineers of member companies in the two trade associations.

Inauguration of this new course in sales engineering is a part of the promotion program for the industry, which has been planned for 1948 by the National Machine Tool Builders Assn. under its new president, A. G. Bryant, vice-president, Cleereman Machine Tool Co., Chicago.

Classes will be in Sibley College of Engineering at Cornell University, and the faculty of 24 men will be under the direction of Professor Harry J. Loberg, Dept. of Industrial Engineering at Cornell. The faculty will include men from the Cornell faculty, sales executives from the industry and its dealers, and customers of long experience in the purchase and application of machine tools.

The course will link the resources of the two trade organizations with those of Cornell University. It will cover the products, methods and engineering types of analysis involved in the selection of suitable equipment and the sales procedure to be used in presenting specific information on the use of specific tools for specific jobs for the use of the customer.

Subject matter will range from the fundamentals of machine tool selling through market research and product survey, with special attention to tooling-up, work simplification, man-machine charts, machine layout, material handling and engineering economy.

The course is the first to be presented by a university directed expressly to the sales problems of capital equipment. There have been many other sales courses, but these have included, in the main, the study of the sale of consumer products.

The Cornell course will consist of lectures, discussions, demonstrations and written assignments, with classes daily from 9 a.m. to 3:30 p.m., 5 days a week.

Studies will be made of the profits which may be possible through the use of recent developments of the machine tools developed since the war, and of the technique of sales presentations and interviews.

The students will be housed in fraternity houses on the campus. Applications, from members of the two cooperating associations, will be made through the National Machine Tool Builders Assn. or through the American Machine Tool Distributors Assn. There are no academic requirements.

The two trade associations have appointed committees to establish this initial course at Cornell University.

National Machine Tool Builders Assn.'s committee on sales and service includes: Daniel R. Weedon, chairman of the committee and secretary, the Blanchard Machine Co., Cambridge, Mass.; Reed M. Andress, second vice-president in charge of sales, Barnes Drill Co., Rockford, Ill.; James C. Hebert, sales manager, Jones & Lamson Machine Co., Springfield, Vt.; J. Herbert Myers, vice-president, machine tool sales, Lodge & Shipley Co., Cincinnati; B. C. Saunders, secretary, Gallmeyer & Livingston Co., Grand Rapids; and Herbert L. Tigges, executive vice-president, Baker Bros., Inc., Toledo.

The committee for the American Machine Tool Distributors Assn. will include: R. L. Giebel, New York, chairman; Arthur B. Kettle, vice-president, Austin-Hastings Co., Inc., Cambridge, Mass.; J. F. Owens, Jr., partner, J. F. Owens Machinery Co., Syracuse; Edward W. Voss, president, Voss Machinery Co., Pittsburgh; George F. Turner, Strong, Carlisle & Hammond Co., Detroit; Frank L. Armstrong, vice-president, Marshall & Huschart Machinery Co., Chicago; E. J. Seifreat, president, the Seifreat-Elstad Machinery Co., Dayton; and H. E. Oatis, partner, Oatis-Booth Machinery Co., Toledo.

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$10 SOLUTION: *Jones & Laughlin Steel Corp.'s solution to a costly production problem for tin-plate users is a simple $10 magnet. Sheets become like poles and repel each other when the magnet is placed horizontally at their edge. This principal has been applied to can fabricating machinery.*

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Industrial Briefs . . .

• EXPANDS — Chicago Metal Hose Corp., Maywood, Ill., is expanding its Elgin, Ill., branch plant for the fabrication of brass specialties. The corporation has also acquired the capital stock of the Ft. Dearborn Mfg. Co., Sterling, Ill., and will operate the firm as a subsidiary in the production of special machinery, tools and dies.

• PURCHASES ASSETS — Jefferson Electric Co., Bellwood, Ill., has purchased the assets of Capacitron Co., 845 N. Kedzie Ave., Chicago, manufacturers of capacitors. The new owner will continue operations of the Capacitron Co. at the present address.

• NEW DISTRICT OFFICE—Brown Instrument Co. has opened a district office at 922 Dermon Bldg., Third & Court Sts., Memphis, Tenn.

• PREFABRICATED BUILDINGS—Ohio Valley Steel Sales Co., Steubenville, Ohio, has entered the prefabricated building industry and has plans for a $300,000 expansion program. The company has purchased a plant and a 15-acre tract at Irondale, Ohio, and production is scheduled to begin Mar. 1.

• ENLARGES PLANT—Frank G. Hough Co., Libertyville, Ill., manufacturer of excavating machinery, has started work on an additional large building to be located adjacent to the present facilities of the company.

• AWARDED EDISON MEDAL—Dr. Joseph Slepian, associate director of the Westinghouse Research Laboratories, was awarded the Edison Medal of 1947 at the winter convention of the American Institute of Electrical Engineers.

• SELLS MACHINE WORKS—The Bignall & Keeler Machine Works of Edwardsville, Ill., manufacturers of pipe threading and cutting machines, has been sold to the John Ramming Machine Co., 4591 McRee, St. Louis, by the N. O. Nelson Co.

• OPENS WICHITA BRANCH—A branch office at 1514 East Central, Wichita, Kan., serving Wichita and surrounding territory, has been opened by the Minneapolis - Honeywell Regulator Co.

• ACQUISITION—The American Cyanamid Co. has announced the acquisition of the S. T. Dahl Co., Los Angeles, formerly sales agent for the Industrial Chemicals Div. of American Cyanamid, along with its personnel. An office and warehouse have been opened at 2472 E 8th St., Los Angeles 21.

• INCREASES FACILITIES — Sunbeam Corp., Chicago, manufacturers of electrical household appliances, has begun construction of a new plant one block east of its present location. The new facilities will be operated in addition to the headquarters plant and a third unit.

• DISTRIBUTOR — L. C. Pensinger & Son, 1609 Oak St., Kansas City, Mo., have been appointed as distributors by John Bath Co., Inc., Worcester, manufacturers of ground thread taps and plug and ring thread gages.

• BUYS SCREW FIRM — Central Screw Co., Chicago, manufacturer of threaded metal fasteners, has purchased the complete plants of the New England Screw Co. located at Keene, N. H.

• TO RECEIVE MEDAL — R. G. McElwee, foundry division manager, Vanadium Corp. of America, Detroit, has been awarded the John A. Penton gold medal of the American Foundrymen's Assn. for 1948 on the basis of his personal contributions to the advancement of the castings industry.

• MOVES—The Pittsburgh district sales office of Link-Belt Co. has moved to 5020 Centre Ave., Pittsburgh 13. Plans are now being developed for new office and factory-branch store buildings to be erected.

First Quarter Export Quotas Announced

Washington

• • • **Export quotas** for the first quarter have been set by the Office of International Trade, Commerce Dept. Additional quotas for the first quarter will be announced later, according to OIT. The following quotas, showing quantities in short tons, have been set for iron and steel products:

Steel sheet bars, and tin-plate bars containing no alloy	750
Steel bars, cold finished, non-alloy, 1 inch and under	8,750
Concrete reinforcement bars	47,000
Other steel bars (hot rolled) containing no alloy, 1 inch and under, except tool steel and specialty steel	40,000
Wire rods, except specialty steel	10,000
Boiler plate	111,500
Other plates, except fabricated (hot and cold rolled included) containing no alloy	
Iron sheets, galvanized	*20,000
Steel sheets, galvanized	
Steel sheets, black, ungalvanized (hot and cold rolled included, containing no alloy; with less than .40 pct carbon content	83,000
Iron sheets, black	
Iron and steel strip (cold rolled), containing no alloy, with less than .40 pct carbon content, except strapping	5,500
Iron and steel strip (hot rolled containing no alloy, with less than .40 pct carbon content	7,650
Terneplate, including long ternes	1,000
Structural iron and steel, structural shapes:	
Except fabricated:	
Angles (except bulb angles), channels and beams, 6 inches and under	35,000
Casing and oil-line pipe:	
Seamless	40,000
Welded	68,535
Seamless black pipe, except casing, oil-line and boiler	4,000
Malleable iron screwed pipe fittings, 150-lb pressure and under	4,500
Floor drains, cast iron; and the following iron and steel pipe fittings, when 150 lbs pressure and under: couplings; galvanized pipe fittings; malleable iron pipe fittings; pipe joints, gray iron, extension; pipe nipples, lap-welded, black; pipe plugs; pipe unions; screw elbows; swage nipples	
Cast-iron pressure pipe	12,000
Cast-iron pressure pipe fittings	
Welded black pipe, steel	**20,000
Welded black pipe, wrought iron	1,700
Welded galvanized pipe, wrought iron	
Welded galvanized pipe, steel	13,000
Iron and steel wire, uncoated	20,000
Wire nails	6,000
Nails: asbestos shingles; cut; roofing, lead-headed; shingle; siding, zinc coated smooth, flat head, cement-coated	

Note: *No more than 25 pct of the quota will be licensed for gages 22 and lighter.

Weekly Gallup Polls . . .

Favor Mutual Defense Pact Between U.S., Britain, France

Princeton, N. J.

• • • **Proposals for a union** or alliance between the United States and the Marshall Plan countries of Western Europe have been made by several diplomatic leaders both here and abroad.

A majority of the American people are ready to see a military alliance formed between the United States, England and France, according to George Gallup, director, American Institute of Public Opinion. Whether they would approve extending such an alliance to include other democracies of Europe remains to be seen.

National opinion was tested by the institute on the following question:

"Do you think the United States, England and France should join together in a permanent military alliance, that is, agree to come to each other's defense immediately if the other is attacked?"

The vote with no opinion included and with it excluded follows:

	Incl'd Pct	Excl'd Pct
Yes	51	59
No	36	41
No opinion	13	

John F. Dulles, Republican authority on foreign affairs, proposed on Jan. 20 that the European nations participating in the Marshall Plan set up a regional mutual defense pact. Two days later, on Jan. 22, Ernest Bevin, British foreign secretary, proposed a similar idea for a "Western European Union." Last November General de Gaulle of France advocated a mutual defense pact between the United States, France and England.

One important revelation in the recent poll is that the American people would not be too keen about having a military alliance with England alone, or with France alone. Their feeling apparently is that an alliance with both those countries together would have value to us, but that an alliance with one, and not with the other, would be much less valuable.

The geographical importance of England and France in any European war undoubtedly plays a part in this attitude, the public being reluctant to see the United States commit itself to military aid to France without knowing whether it could count on British aid, and vice versa.

The polls on an alliance with England alone or France alone were conducted as follows:

"Do you think the United States and England should join together in a permanent military alliance—that is, agree to come to each other's defense immediately if the other is attacked?'

Alliance with Britain only	Pct
Yes	45
No	45
No opinion	10

The same question was asked about France, with the following result:

Alliance with France only	Pct
Yes	32
No	53
No opinion	15

The somewhat different vote on France and England may reflect the fact that France was successfully invaded by the Germans in World War II whereas England escaped invasion.

•

• • • **If the British Labor Party** were forced into a general election right now, there are serious doubts that it could win.

The popularity of Prime Minister Clement Attlee is waning. The majority of British voters with opinions say that the government's record to date is unsatisfactory.

Labor Party Losing Prestige In Eyes of British People; Attlee's Popularity Is Waning

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These facts are brought out in polls by the British Institute of Public Opinion.

The trend of sentiment on Mr. Attlee follows:

"On the whole, do you approve or disapprove of Mr. Attlee as Prime Minister?"

	Approve Pct	Disapprove Pct	No opin. Pct
Aug. 1945	66	19	15
July 1947	51	36	13
Today	44	46	10

"On the whole are you satisfied or dissatisfied with the government's record to date?"

	Pct
Satisfied	41
Dissatisfied	49
No opinion	10

Former Prime Minister Winston Churchill, a member of the House of Commons, has tried repeatedly to force a vote of no-confidence in Commons in the Attlee government, paving the way for a general election. So far the Labor ranks in Parliament have remained solid enough to defeat Mr. Churchill's strategy, and it is believed unlikely that there will be an election until the next scheduled date, which is 1950.

However, a poll by the British Institute last November indicated that if an election had been held at that time, the Labor Party would have run second to the Conservatives.

The vote, and a comparison with the 1945 election, follows:

	Election 1945 Pct	Nov. Poll Pct
Labor	49	40
Conservatives	39	44
Liberal	9	11
Others	3	5

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

700 Tons, Philadelphia, F. W. Woolworth Co., through Turner Construction Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.

210 Tons, Du Page County, Ill., bridge section 58-F and TI-VP, Midland Structural Steel Co., previously reported low bidder, has been awarded the contract.

200 Tons, Chicago, Chicago & Northwestern R.R. 110-ft deck plate girder span to American Bridge Co., Pittsburgh.

185 Tons, Lancaster, Pa., silk mill for Widder Bros., to Bethlehem Steel Co., Bethlehem.

130 Tons, Chester, Pa., store and theatre building, to Belmont Iron Works, Philadelphia.

120 Tons, Skokie, Ill., building for Farley Mfg. Co. to Duffin Iron Works, Chicago.

• • • **Fabricated steel inquiries** this week included the following:

1600 Tons, Warren County, Pa., bridge for Pennsylvania R.R., Feb. 13.

1500 Tons, State of Colorado, power house for the Public Service Co. of Colorado. Total project estimated at $12 million.

780 Tons, Indianapolis, Michigan St. bridge. All bids rejected. Project reopened on Jan. 30. Smith & Johnson Co. of Indianapolis, low bidder.

770 Tons, Trenton, N. J., bridge on Route 26 Section 1-A, Pennsylvania Dept. of Highways, Feb. 26.

450 Tons, Bloomington, Neb., spillway bridge through U. S. Engineers, Guy F. Atkinson & Associates of Los Angeles, low bidder.

350 Tons, Clay County, Ill., state highway bridge section 18F. Midland Structural Steel Co., low bidder.

280 Tons, Hulah, Okla., service bridge for Hulah Dam through U. S. Engineers, Mittry Bros. Construction Co. of Los Angeles, low bidder.

260 Tons, Cumberland County, Ill., state highway bridge section F-X-M. American Bridge Co., low bidder.

• • • **Reinforcing bar awards** this week included the following:

2450 Tons, Los Angeles, second unit, La-Verne water softening plant, Metropolitan water district, through L. E. Dixon Co. to Ceco Steel Products Co., Chicago.

1600 Tons, Cambridge, Neb., Medicine Creek Dam through C. F. Lytel Co., Sioux City, to Truscon Steel Co., Cleveland.

1000 Tons, Washington, DuPont Circle, District of Columbia Commission, through John McShain, Philadelphia, to Bethlehem Steel Co., Bethlehem.

770 Tons, Iron Mountain, Mich., Veterans' hospital, Gus Newburg Construction Co., previously reported low bidder, has received the award. Steel to be furnished by J. T. Ryerson & Son, Inc., Chicago.

680 Tons, Fort Wayne, Ind., Veterans' hospital through Gus Newburg Construction Co. to J. T. Ryerson & Son, Inc., Chicago.

500 Tons, Omaha, Veterans' hospital. Peter Kewit Sons Co., previously reported low bidder, has been awarded contract.

• • • **Reinforcing bar inquiries** this week included the following:

1200 Tons, Evanston, Ill., city water works project. S. N. Nielson Co., low bidder.

705 Tons, San Pedro, Calif., Unit . Joint Outfall A, Los Angeles County Sanitation District, Los Angeles, bids to Feb. 25.

700 Tons, Wilmington, Del., experimental station for E. I. du Pont de Nemours Co.

270 Tons, Red Wing, Minn., power house for Northern States Power Co.

250 Tons, Oakland, Calif., three bridges, Eastshore Freeway, California Div. of Highways, Sacramento, bids to Mar. 3.

• • • **Railroad awards** this week included the following:

The Erie R.R. has ordered 17 Diesel electric locomotives—two freight and four switchers from American Locomotive, four switchers from Baldwin Locomotive Co. and two freight and five switchers from Electro Motive Div. of General Motors Corp. The Wheeling & Lake Erie R.R. has ordered 500 50-ton gondolas from Bethlehem Steel Co. Clinchfield R.R. Co. has ordered 1000 50-ton hopper cars from American Car & Foundry Co. The New York Central System has placed orders for 5000 freight cars. The orders are for 2000 55-ton box cars, 2000 55-ton self-clearing hopper cars and 1000 70-ton gondola cars. One half of each group is for the N. Y. Central R. R. and the other half for its affiliate, the Pittsburgh & Lake Erie. The cars will be built by Despatch Shops, Inc., East Rochester, N. Y.

• • • **Railroad inquiries** this week included the following:

The Chicago & Northwestern R.R. is inquiring for 2050 freight cars—500 70-ton high side gondolas, 500 70-ton triple hoppers, 1000 50-ton box cars and 50 70-ton 65 ft. 6-in. mill type gondolas.

Coming Events

Feb. 15-19 American Institute of Mining and Metallurgical Engineers, annual meeting, New York.

Feb. 28, March 1-2 American Metallizing Contractors Assn., meeting, Cleveland.

Mar. 1-4 American Society of Mechanical Engineers, meeting, New Orleans.

Mar. 3-5 Society of Automotive Engineers, national passenger car meeting, Detroit.

Mar. 15-19 ASTE Industrial Exposition, Cleveland.

Mar. 18-19 Magnesium Assn., annual meeting, New York.

Apr. 5-8 Southern Machinery and Metals Exposition, Atlanta.

Apr. 5-8 National Assn. of Corrosion Engineers, annual conference and exhibition, St. Louis.

Apr. 7-9 American Society of Civil Engineers, meeting, Pittsburgh.

Apr. 12-14 Openhearth Steel Committee and Coke Oven, Blast Furnace and Raw Materials Committee, AIME, annual conference, Pittsburgh.

Apr. 15-16 Metal Powder Assn., annual meeting and exhibit, Chicago.

Apr. 19-23 American Chemical Society, national meeting, Chicago.

Apr. 22-23 Westinghouse Electric Corp., Machine Tool Forum, Buffalo.

May 3-7 American Foundrymen's Assn., convention and show, Philadelphia.

May 20-21 Society of the Plastics Industry, annual meeting, Atlantic City, N. J.

May 26-27 American Iron & Steel Institute, meeting, New York (restricted to members only).

May 27-29 Society for Experimental Stress Analysis, meeting, Pittsburgh.

Pressed Metal Meeting

Toledo

• • • **Members of** the Pressed Metal Institute, Toledo district, heard Frank Rising, general manager, Automotive & Aviation Parts Mfrs., Inc., Detroit, at their February meeting.

In addition to the National Meeting of Trustees, members of the Institute made trips through The Acklin Stamping Co. and The Toledo Stamping Co. The visiting delegates also saw the new stamping plant of Willys-Overland Co.

Raising Steam Capacity

Pittsburgh

• • • **Steam supply** at the Midland, Pa., works of Crucible Steel Co. of America will be modernized and increased with the installation of two new boilers to be completed by The Rust Engineering Co., Pittsburgh. The project is expected to cost $800,000.

Two Babcock & Wilcox steam generators, each capable of a peak capacity of 100,000 lb of steam at 200 psi gage and 500° F. total temperature will be installed. They will be equipped to burn pulverized coal, with provisions for future burning of blast furnace gas. A pneumatic ash handling system will be installed to serve the new units.

Foundry Societies Forming National Castings Council

Cleveland

• • • **Eight leading** foundry societies and associations have formally organized National Castings Council to provide a medium for cooperative action among members on matters of mutual interest beyond the scope of the individual societies or in connection with problems which can be better handled by cooperative action.

Founding members are as follows: American Foundrymen's Assn., Foundry Equipment Manufacturers Assn., Foundry Supply Manufacturers Assn., Gray Iron Founders' Society, National Founders Assn., Non-Ferrous Founders' Society, Inc., and Steel Founders' Society of America.

The council has elected the following officers: President, Howard A. Stockwell, secretary, Barbour Stockwell Co., Cambridge, Mass., and president, Gray Iron Founders' Society; vice-president, Otto A. Pfaff, president, American Wheelabrator & Equipment Corp., Mishawaka, Ind., and president, Foundry Equipment Manufacturers Assn.; treasurer, F. Ray Fleig, president, Smith Facing & Supply Co., Cleveland, and president, Foundry Supply Manufacturers Assn.

Court Order Halts General Motors In Insurance Squabble

Detroit

• • • **Prospects that** the 1948 wage negotiations between General Motors and the UAW-CIO would follow the familiar stormy pattern seemed assured this week when NLRB obtained an order from the United States District Court in New York City, temporarily restraining General Motors from putting into effect the modification of its present insurance plan for employees included in bargaining units represented by the UAW-CIO. This is believed to be the first such action filed against a large corporation under the Taft-Hartley Act.

The union has charged that GM has since Nov. 21, 1947, "engaged in a continuous course of coercion and intimidation" to compel hourly employees to participate in a new group insurance plan being offered by the company.

According to the union, GM agreed in writing on Apr. 24, 1947 that disability and life insurance matters affecting hourly rated employees covered by UAW-CIO contracts should be a subject for collective bargaining between the company and the union.

The union claims GM is attempting to take credit for an employees' benefit program that was initiated by the union, thereby tending, it is contended, to discredit the union.

According to a spokesman from General Motors, employees represented by the UAW-CIO who were covered by the old insurance plan will continue to be covered under that plan. Employees so represented, who were not insured under the old plan, but who signed up for the new plan will have no insurance until the case is finally settled.

Other employees represented by unions other than the UAW-CIO who have signed up for the new insurance will be covered under the new GM plan commencing Feb. 1.

Kaiser-Frazer Net Profit

Detroit

• • • **Kaiser-Frazer Corp.** has announced a net profit of $13,415,861 for the final quarter of 1947. The profit is based on net sales for the final quarter of $101,999,563. For the year ended Dec. 31, 1947, K-F has reported gross sales of $260,975,279 and a net profit of $19,505,131.

50 YEARS AGO

THE IRON AGE. *February 10, 1898*

• "A passenger car on the New York, New Haven & Hartford R.R., finished with sheet copper instead of conventional paint and varnish over the wood exterior is reported to have given satisfactory results after a year of service. The *Railroad Gazette* reports that a coach on the same road is now being covered with aluminum bronze and another with sheet aluminum. The new method consists of covering each piece of wood sheathing and paneling with the sheet metal before applying the parts to the car. Where it requires 28 days to finish a coach with paint and varnish, the job can be done with metal plating in 18 days."

• **"The largest generator for electric traction work ever built is now under construction at the General Electric plant, Schenectady, N. Y. Total weight of this generator will be 174,000 lb and because of the large diameter of the armature, 12 ft 9 in., the generator cannot be transported by rail in its completed state. It is designed to develop over 4000 hp."**

• "With its wide stretching plains, its magnificent water systems and its unknown wealth of precious metals and other valuable mineral deposits, there is a future for Russia's Siberia too great to be overlooked. The new Siberian railway opens up the vast resources to our own Pacific slope and to the whole people of the U. S."

• **"A special double crank press built by the E. W. Bliss Co., 11 Adams St., Brooklyn, is so designed that it may be used for nearly all operations required in the manufacture of sheet iron and steel goods, such as vapor stoves, and ovens, coal hods, drip pans and buckets, and also for operating gangs of punches."**

• "A baking trust is the latest addition to the list of big industrial combinations. Of the large biscuit and cracker concerns, 90 pct were merged last week under the title of the National Biscuit Co., which was incorporated in New Jersey with a capital of $55 million."

The Iron Age Metalworking Buyers' Guide

. . . A seventh section of the Buyers' Guide is presented herewith. Previous sections have appeared weekly starting with the Annual Review Issue, Jan. 1, 1948, p. 208. This guide has been developed to give executives and purchasing agents of the metal working industry a directory with a much finer breakdown in classifications than has been heretofore available. Additional sections of the guide will be published weekly.

C

Goodyear Tire & Rubber Co., Akron 16, Ohio.
Iding, M. P., Disc Grinding Compound Co., 3530 W. Pierce St., Milwaukee 4.
Manderscheid Co., 810 Fulton St., Chicago 7.
PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.
PITTSBURGH PLATE GLASS CO., PAINT DIV., Grant Bldg., Pittsburgh 19.
Plaskon Div., Libbey-Owens-Ford Glass Co., Sylvan Ave., Toledo 6.
Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.
TREMCO MFG. CO., 8710 Kinsman Rd., Cleveland 4.
UNITED CHROMIUM INC., 51 E. 42nd St., New York 17.
U. S. STONEWARE CO., PROCESS EQPT. DIV., P. O. Box 350, Akron, Ohio.

Centrifugal Casting Equipment

ALLIS-CHALMERS MFG. CO., 1126 So. 70th St., Milwaukee 1.
Ecco High Frequency Corp., 7018 Hudson Blvd., North Bergen, N. J.
SAUNDERS, ALEXANDER, & CO., 95 Bedford St., New York 14.
Technic Inc., 39 Snow St., Providence 3.
Torit Mfg. Co., Walnut & Exchange Sts., St. Paul 2.

Centers, Lathe, Etc.

Abrasive Machine Tool Co., East Providence, R. I.
BROWN & SHARPE MFG. CO., 250 Promenade St., Providence 1.
Drafto Corp., Cochranton, Pa.
KENNAMETAL, INC., Latrobe, Pa.
Millersburg Reamer & Tool Co., Millersburg, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.
WHITMAN & BARNES, Div. of United Drill & Tool Corp., Detroit 16.

Centrifugal Finishing Machines

Enthone, Inc., 442 Elm St., New Haven 11, Conn.
Tolhurst Centrifugals Div., American Machine & Metals, Inc., East Moline, Ill.

Chain Drives
(See Chains, Power Transmission)

Chain, Transmission

MORSE CHAIN CO., Ithaca, N. Y.
RICHTER, JOS., & CO., 32 Washington Ave., Belleville 9, N. J.
WHITNEY CHAIN & MFG. CO., Hamilton Street, Hartford 2.

Chains

AMERICAN CHAIN DIV., AMERICAN CHAIN & CABLE CO., 230 Park Ave., New York.
Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.
CLEVELAND CHAIN & MFG. CO., Cleveland 5.
Farrell-Cheek Steel Co., Sandusky, Ohio.
JEFFREY MFG. CO., 925 N. 4th St., Columbus 16, Ohio.
MORSE CHAIN CO., Ithaca, N. Y.
Ramsey Chain Co., Inc., Troy Rd., Albany 1.
WHITNEY CHAIN & MFG. CO., Hamilton St., Hartford 2.

Chains, Conveyer

AMERICAN CHAIN DIV., AMERICAN CHAIN & CABLE CO., INC., 230 Park Ave., New York.
Driver-Harris Co., Harrison, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9.
MEDART CO., 3500 DeKalb St., St. Louis.
Stevens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Ill.
Webb, J. B., Co., Joy Rd., Detroit
WHITNEY CHAIN & MFG. CO., 240 Whitney St., Hartford 2.

Chains, Draw Bench

Chain Belt Co., 1622 W. Bruce St., Milwaukee.
Link-Belt Co., 2410 W. 18th St., Chicago 8.
Palmer-Bee Co., 1800 Poland Ave., Detroit.

Chains, Forged

BALDT ANCHOR, CHAIN & FORGE DIV., Boston Metals Co., P. O. Box 350, Chester, Pa.
McKay Co., 1930 Grantley Rd., York, Pa.
Palmer-Bee Co., 1800 Poland Ave., Detroit. troit.
Stephens-Adamson Mfg. Co., Ridgeway Ave., Aurora, Ill.

Chains, Heat Resistant

Alloy Casting Co., Victor Ave., Champaign, Ill.
Beals, McCarthy & Rogers, Inc., (Distributor), 50 Terrace, Buffalo 5.
Chicago Steel Foundry Co., Kedzie Ave. & 37th St., Chicago 32.
David Round & Son, Broadway & Henry Sts., Cleveland 5.
Diamond Chain Co., Inc., 502 Kentucky Ave., Indianapolis 7.
Driver-Harris Co., P. O. Drawer 31, Harrison, N. J.
JEFFREY MFG. CO., 925 N. 4th St., Columbus 16, Ohio.
MICHIANA PRODUCTS CORP., Michigan City, Ind.
PITTSBURGH GEAR & MACHINE CO., Smallman & 27th Sts., Pittsburgh 22.
Sterling Alloys, Inc., Woburn, Mass.
YOUNGSTOWN WELDING & ENGINEERING CO., 3800 W. Oakwood Ave., Youngstown 9.

Chains, Open Link

BALDT ANCHOR, CHAIN & FORGE DIV., Boston Metals Co., P. O. Box 350, Chester, Pa.
CLEVELAND CHAIN & MFG. CO., Cleveland 5.

Chains, Power Transmission

ATLANTIC GEAR WORKS, INC., 200 Lafayette St., New York 12.
Diamond Chain Company, Inc., 502 Kentucky Ave., Indianapolis 7.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9.
Peoria Malleable Casting Co., Alexander & Adams St., Peoria 1, Ill.
Ramsey Chain Co., Inc., Troy Rd., Albany 1.

Chains, Sling

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Bridgeport Chain & Mfg. Co., 1150 Crescent Ave., Bridgeport, Conn.
Cleveland Chain & Mfg. Co., Henry St., Cleveland.
International Chain & Mfg. Co. York, Pa.
Taylor, S. G., Chain Co., Box 509, Hammond, Ind.
U. S. Steel Supply Co., 1300 Wabansia Ave., Chicago 90.

Chaplets, Gray Iron

Blake & Johnson Co., Thomaston Ave., Waterville, Conn.
S. Cheney & Son, Manlius, N. Y.
Fanner Mfg. Co., Brookside Blvd., Cleveland.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland.
Obermayer Co., 2600 W. 18th St., Chicago.

Charging Boxes

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh.
PITTSBURGH STEEL FOUNDRY CORP., Glassport, Pa.

Charging Machines

Bonnot Co., 722 Mulberry Rd., S. E., Canton 2, Ohio.
EDGAR E. BROSIUS CO., 19th St. & P.R.R., Sharpsburg, Pittsburgh 15.
MESTA MACHINE CO., P. O. Box 1465, Pittsburgh 30.
Modern Equipment Co., Port Washington, Wis.

Charging Systems, Cupola

LAKE ERIE ENGINEERING CORP., Buffalo 17.
SHEPARD NILES CRANE & HOIST CORP., 356 Schuyler Ave., Montour Falls, N. Y.
WHITING CORP., Harvey, Ill.

Charging Reels

Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh.

Charts, Instrument

GORDON, CLAUDE S., CO., 3000 S. Wallace St., Chicago 16.
Grammes, L. F., & Sons, Inc., Union St., Allentown, Pa.
Gubelman Publishing Co., 10 Garden St., Newark, N. J.

Chasers, Thread

Geometric Tool Co., Blake & Valley Sts., New Haven 15, Conn.
LANDIS MACHINE CO., Church & Fifth Sts., Waynesboro, Pa.
NATIONAL ACME CO., 170 E. 131st St. Cleveland 8.
Pipe Machinery Co., 930 E. 70th St., Cleveland 8.
PRATT & WHITNEY, DIV. NILES-BEMENT-POND CO., West Hartford, Conn.
Rickert-Shafer Co., Erie, Pa.

Chemicals, Electroplating

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
Beam-Knodel Co., 195 Lafayette St., New York 12.
DU PONT, E. I., DE NEMOURS & CO., INC., Explosives Dept., Wilmington 98.
Enthone, Inc., 442 Elm St., New Haven 11, Conn.
HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.
Indium Corp. of America, 60 E. 42nd St., New York 17.

Kocour Co., 4800 S. St. Louis Ave., Chicago.
Nankervis, Geo. L., Co., 5442 Second Blvd., Detroit 2.
Puritan Mfg. Co., Waterbury, Conn.
Quaker Chemical Products Corp., Conshohocken, Pa.
Sommers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.
Technic Inc., 39 Snow St., Providence 3.
UNITED CHROMIUM INC., 51 E. 42nd St., New York 17.

Chemicals, Industrial

ALUMINUM CO. OF AMERICA, 2185 Gulf Bldg., Pittsburgh 19.
Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.
Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York 17.
Craft Products Co., Pittsburgh 1.
DETREX CORP., 14331 Woodrow Wilson, Detroit 32.
DU PONT, E. I., DE NEMOURS & CO., INC., Explosives Dept., Wilmington 98, Del.
GENERAL CHEMICAL CO., BAKER & ADAMSON DIV., 40 Rector St., New York.
Magnus Chemical Co., South Ave., Garwood, N. J.
Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17.
METAL & THERMIT CORP., 120 Broadway, New York 5.
PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.
PITTSBURGH PLATE GLASS CO., COLUMBIA CHEMICAL DIV., 5th Ave. at Bellefield, Pittsburgh 13.
PITTSBURGH PLATE GLASS CO., PAINT DIV., Grant Bldg., Pittsburgh 19.
Puritan Mfg. Co., Waterbury, Conn.
Quaker Chemical Products Corp., Conshohocken, Pa.
Reilly Tar & Chemical Corp., Merchants Bank Bldg., Indianapolis 4.
Solvay Sales Corp., 40 Rector St., New York 6.
TITANIUM ALLOY MFG. CO., Box C, Bridge Stat., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17.

Chipping Machines, Billet and Ingot

Bonnot Co., 722 Mulberry Rd. S. E., Canton 2, Ohio.

Chlorinated Compounds

Bakelite Corp., 300 Madison Ave., New York 17.
Halowax Products Div., Union Carbide & Carbon Co., 30 E. 42nd t., New York 18.
Hooker Electrochemical Co., 1950 Ward St., Niagara Falls, N. Y.

Chrome Refractories
(See Refractories, Chrome)

Chromic Acid

DU PONT, E. I., DE NEMOURS & CO., INC., Explosives Dept., Wilmington 98, Del.
Enthone, Inc., 442 Elm St., New Haven 11, Conn.
HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J.
Puritan Mfg. Co., Waterbury, Conn.
Sommers Bros. Mfg. Co., 3439-41-43 No. Broadway, St. Louis 7.
Thomas Hoist Co., 20 S. Hoyne Ave., Chicago 12.

Chromium Copper

ELECTRO METALLURGICAL CO., 80 E. 42nd St., New York 17.

Chromium, Metal and Alloys

Beals, McCarthy & Rogers, Inc., (Distributors), 50 Terrace, Buffalo 5.
Burgess-Parr Co., Foot of Exchange St., Freeport, Ill.
Chrominum Mining & Smelting Corp., P. O. Drawer 968, Sault Ste. Marie, Ontario.
ELECTRO METALLURGICAL CO., 30 E. 42nd St., New York 17.
METAL & THERMIT CORP., 120 Broadway, New York 5.
Niagara Falls Smelt. & Refg. Div., Continental United Indus. Co., Inc., 2208 Elmwood Ave., Buffalo 17.
UNITED CHROMIUM INC., 51 E. 42nd St., New York 17.
Vanadium Corp. of America, 420 Lexington Ave., New York 17.
Wall-Colmonoy Corp., 714 Fisher Bldg., Detroit 2.

Chromium Plating Equipment
(See Electroplating Equipment)

Chromium Plating, Industrial

Chrome Engineering Co., Inc., 3041 Perkins Ave., Cleveland 14.
ELECTRIC AUTO-LITE CO., BAY MFG. DIV., Toledo 1.
LOGAN PLATERS, INC., 555 Main St., North Tonawanda, N. Y.
STANDARD NICKEL-CHROMIUM PLATING CO., 811 E. 62nd St., Los Angeles 1.
Steel Heddle Mfg. Co., 2000 Allegheny Ave., Philadelphia.
UNITED CHROMIUM, INC., 51 E 42nd St., New York 17.

Chucking Machines

BRYANT CHUCKING GRINDER CO., Springfield, Vt.
BULLARD CO., Ray St., Bridgeport 2, Conn.
CLEVELAND AUTOMATIC MACHINE CO., 1114 NBC Bldg., Cleveland 14.
CONE AUTOMATIC MACHINE CO., Windsor, Vt.

• Every company in the metalworking industry is urged to check this section of the new IRON AGE Metalworking Buyers' Guide, and send in corrections and additions to assure complete accuracy in the first reprint of the directory. Forward corrections to THE IRON AGE, Attention Buyers' Directory, 100 E. 42nd St. New York 17.

GOSS & DELEEUW MACHINE CO., New Britain, Conn.
International Detrola Corp., Foster Div., 1100 Beardsley Ave., Elkhart, Ind.
JONES & LAMSON MACHINE CO., Springfield, Vt.
J. L. Lucas & Son, Inc., (Rebuilt) Bridgeport, Conn.
NATIONAL ACME CO., 170 E. 131st St., Cleveland.
NEW BRITAIN-GRIDLEY MACHINE DIV., NEW BRITAIN MACHINE CO., Chestnut St., New Britain, Conn.
Oster Mfg. Co., E. 61st St., Cleveland.
POTTER & JOHNSTON MACHINE CO., 1027 Newport Ave., Pawtucket, R. I.
WARNER & SWASEY CO., Carnegie Ave., Cleveland.

Chucks, Drill

Almond, T. R., Mfg. Co., Inc., Ashburnham, Mass.
GISHOLT MACHINE CO., 1245 E. Washington Ave., Madison 3, Wisc.
Jacobs Mfg. Co., Hartford 2.
L-W Chuck Co., 24 S. St. Clair St., Toledo 4.
Westcott Chuck Co., Oneida, N. Y.

Chucks, Lathe

Acme Tool Co., 96 Warren St., New York 7.
Almond, T. R., Mfg. Co., Inc., Ashburnham, Mass.
L-W Chuck Co., 24 S. St. Clair St., Toledo 4.
CUSHMAN CHUCK CO., Hartford 2.
GISHOLT MACHINE CO., 1245 E. Washington Ave., Madison 3, Wisc.
JACOBS MFG. CO., Hartford 2.
McCrosky Tool Corp., S. Main St., Meadville, Pa.
Westcott Chuck Co., Oneida, N. Y.

Chucks, Magnetic

Acme Tool Co., 96 Warren St., New York 7.
Arter Grinding Machine Co., 15 Sagamore Rd., Worcester 5.
BROWN & SHARPE MFG. CO., Promenade St., Providence 1.
DOALL CO., Minnesota Div., 1315 Washington Ave., Minneapolis.
Hanchett Mfg. Co., Gardener St., Big Rapids, Mich.
HILL-ACME CO., 4533 St. Clair Ave., Cleveland 2.
Ideal Commutator Dresser Co., Park Ave., Sycamore, Ill.
L-W Chuck Co., 24 S. St. Clair St., Toledo 4.
Magnetic Engineering Mfg. Co., Van Houten Ave., Clifton, N. J.
TAFT-PEIRCE MFG. CO., Mechanic Ave., Woonsocket, R. I.
Walker, O. S., Co., Inc., Worcester 6.

Cinder Pots

CONTINENTAL FOUNDRY & MACHINE CO., Grant Bldg., Pittsburgh.
MACKINTOSH HEMPHILL CO., 901 Binghamton St., Pittsburgh 3.
PITTSBURGH STEEL FOUNDRY CORP., Glassport, Pa.

Circuit Breakers, Electric

ALLIS-CHALMERS MFG. CO., 1100 S. 70th St., Milwaukee 1.
Anderson Mfg. Co., 290 A. St., Boston.
Bryant Electric Co., Barnum Sta., Bridgeport, Conn.
Electric Auto-Lite Co., Toledo 1.
Electrical Engineers Eqpt. Co., Melrose Park, Ill.
GENERAL ELECTRIC CO., Schenectady 5.
I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30.
SQUARE D CO., 6010 Rivard St., Detroit.
WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh.

Clad Steel
(See Steel, Clad)

Clamps, Hose

Aircraft Standards Parts Co., Inc., 1711 19th Ave., Rockford, Ill.
Allen, W. D., Mfg. Co., 560 W. Lake St., Chicago 6.
Amercan Stamping Co., Battle Creek, Mich.
GARRETT, GEO. K., CO., INC., 1421 Chestnut St., Philadelpha 2.
Willows Mfg. Co., 341 39th St., Brooklyn 32.

Clamshells
(See Excavating Machines, Clamshell)

Clay Processing Equipment, Grinding, Mixing, Extruding

Bonnot Co., 722 Mulberry Rd., S. E., Canton 2, Ohio.
Porter, H. K., Co., Oliver Bldg., Pittsburgh 22.

Cleaners, Chlorinated Hydrocarbon

American Chemical Pant Co., Ambler, Pa.
Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York 17.
Detrex Corp., 14331 Woodrow Wilson, Detroit.
Enthone, Inc., 442 Elm St., New Haven 11, Conn.
PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.
Phillips Mfg. Co., 3475 W. Touhy Ave., Northtown Sta., Chicago 45.
Quaker Chemical Products Corp., Conshohocken, Pa.

Cleaners, Emulsion

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.
Detrex Corp., 14331 Woodrow Wilson, Detroit.
Enthone, Inc., 442 Elm St., New Haven 11, Conn.
Fidelity Chem. Prod. Corp., 430 Riverside Ave., Newark 4, N. J.
HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J.
Mitchell-Bradford Chemical Co., 2446 Main St., Stratford P. O., Bridgeport, Conn.
PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.
Puritan Mfg. Co., Waterbury, Conn.

Quaker Chemical Products Corp., Conshohocken, Pa.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

Cleaners, Metal

Allied Industrial Products Co., 620 N. Michigan Ave., Chicago 11.

American Chemical Paint Co., Ambler, Pa.

BETTER FINISHES & COATINGS, INC., 268-276 Doremus Ave., Newark 5, N. J.

Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York 17.

CHEMICAL CORP., 54 Waltham Ave., Springfield 9, Mass.

Craft Products Co., Pittsburgh 1.

DETREX CORP., 14331 Woodrow Wilson, Detroit 32.

DU PONT, E. I., DE NEMOURS & CO., INC., EXPLOSIVES DEPT., Wilmington 98, Del.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Fidelity Chem. Prod. Corp., 430 Riverside Ave., Newark 4, N. J.

HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.

Magnus Chemical Co., South Ave., Garwood, N. J.

McAleer Mfg. Co., Fourth & Water Sts., Rochester, Mich.

Mitchell-Bradford Chemical Co., 2446 Main St., Stratford P. O., Bridgeport, Conn.

NEILSON CHEMICAL CO., 6576 Benson Ave., Detroit 7.

OAKITE PRODUCTS, INC., 22 Thames St., New York 6.

PARK CHEMICAL CO., 8088 Military Ave., Detroit 4.

Parkin, Wm. M., Co., 1102 Highland Bldg., Pittsburgh 6.

PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.

PITTSBURGH PLATE GLASS CO., PAINT DIV., Grant Bldg., Pittsburgh 19.

Quaker Chemical Products Corp., Conshohocken, Pa.

Solventol Chemical Products, Inc., 15841 Second Blvd., Detroit 3.

Solvay Sales Corp., 40 Rector St., New York 6.

Technic, Inc., 39 Snow St., Providence 3.

Turco Products, Inc., P. O. Box 2649, Terminal Annex, Los Angeles 54.

U. S. STONEWARE CO., PROCESS EQUIP. DIV., Box 350, Akron, Ohio.

WAVERLY PETROLEUM PRODUCTS CO., Drexel Bldg., Philadelphia 6.

WYANDOTTE CHEMICALS CORP., Wyandotte, Mich.

Cleaners, Natural and Manufactured Gas

Blaw-Knox Co., Pittsburgh.

Cleaners, Petroleum Solvent

Allied Industrial Products Co., 620 North Michigan Ave., Chicago 11.

Arco Co., 7313 Bessemer Ave., Cleveland 4.

Beam-Knodel Co., 195 Lafayette St., New York 12.

BETTER FINISHES & COATINGS, INC., 268-276 Doremus Ave., Newark 5, N. J.

Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York 17.

HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.

Mathieson Alkali Works, Inc., 60 E. 42nd St., New York 17.

Mitchell-Bradford Chemical Co., 2446 Main St., Stratford P. O., Bridgeport, Conn.

National Refining Co., Hanna Bldg., Cleveland 15.

PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.

Puritan Mfg. Co., Waterbury, Conn.

Quaker Chemical Products Corp., Conshohocken, Pa.

SOCONY-VACUUM OIL CO., INC., 26 Broadway, New York 4.

Sommers Bros. Mfg. Co., 3439-41-43 N. Broadway, St. Louis 7.

Turco Products, Inc., Box 2649, Terminal Annex, Los Angeles 54.

Cleaning & Finishing Equipment

Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y.

. . mechanical load brakes are **out!**

the P&H MAGNETORQUE is in!

Yes, the MAGNETORQUE Crane Control has made the mechanical load brake obsolete. It serves no further purpose and is no longer offered on P&H Cranes. Into the discard with it have gone all the old maintenance problems.

The new P&H MAGNETORQUE Crane Control brings you the finest speed-load characteristics. Moreover, it brings you the smoothest control ever put on an overhead crane, with the convenience and lower cost of AC power.

It's the newest Added Value on P&H Overhead Cranes. And an important one for all who seek better control, uninterrupted service and lower maintenance costs in crane operation.

Complete information about the new P&H MAGNETORQUE Crane Control is available in Bulletin C-39. If you haven't sent for your copy, do it today.

P&H

OVERHEAD ELECTRIC CRANES

4401 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

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DETROIT SHEET METAL WORKS, 1298 Oakman Blvd., Detroit 6.
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OPTIMUS EQUIPMENT CO., 7 Water St., Matawan, N. J.
PANGBORN CORP., 1297 Pangborn Blvd., Hagerstown, Md.
Parsons Engineering Corp., 2549 E. 79th St., Cleveland 4.
Phillips Mfg. Co., 3475 W. Touhy Ave., Northtown Sta., Chicago 45.
RANSOHOFF, N., INC., 20 E. 72nd St., Elmwood Place, Cincinnati 16.
Solventol Chemical Products, Inc., 15841 Second Blvd., Detroit 3.
STURGIS PRODUCTS CO., 734 Jacob St., Sturgis, Mich.
Troy Laundry Machinery Div., American Machine & Metals, Inc., East Moline, Ill.
U. S. Galvanizing & Plating Equipment Corp., 27-41 Heyward St., Brooklyn 11.

Cleaning Machines, Vacuum, Industrial

SPENCER TURBINE CO., 497 New Park Ave., Hartford 6.

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Acme Tool Co., 96 Warren St., New York 7.
Crouse-Hinds Co., 1350 Wolf St., Syracuse, N. Y.

Clocks, Watchmen's

American District Telegraph Co., 155 Ave. of Americas, New York.
Chicago Watchclock Corp., 1520 Wabash Ave., Chicago 5.
Detex Watchclock Corp., 20 Beach St., Boston.

Cloth, Wire

Beals, McCarthy & Rogers, Inc. (Distributor), 50 Terrace, Buffalo 5.
Central Steel & Wire Co., 3000 W. 51st St., Chicago 32.
Cleveland Wire Cloth & Mfg. Co., 3573 E. 78th St., Cleveland 5.
Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Mummert-Dixon Co., Philadelphia & Gay Sts., Hanover, Pa.
Tyler, W. S., Co., 3615 Superior Ave., Cleveland 14.
Wickwire Bros., Inc., Cortland, N. Y.
WICKWIRE SPENCER STEEL DIV., COLORADO FUEL & IRON CORP., 500 Fifth Ave., New York 18.

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Industrial Gloves Co., 700 Garfield Blvd., Danville, Ill.
Industrial Products Co., 2746 N. 4th St., Philadelphia 33.
Jessar, Fred, Co., 1230 Vine St., Philadelphia 7.
Lincoln Electric Co., Coit Road & Kirby Ave., Cleveland 1.

Mine Safety Appliance Co., Braddock, Thomas & Meade Sts., Pittsburgh.
Stevens, Frederic B., Inc., (Distributor) 510 Third St., Detroit 26.
Universal Power Corp., 769 Carnegie Ave., Cleveland 15.

Cloths, Wiping
Burcott Mills, 600 W. Fulton St., Chicago.
Industrial Wiping Cloth Co., Long Island City 1, N. Y.
Wiping Materials, Inc., 2000 N. Main St., St. Louis 6.

Clutches
(See also Specific Types)
DODGE MFG. CO., Mishawaka, Indiana.
TWIN DISC CLUTCH CO., 1321 Racine Ave., Racine, Wis.

Clutches, Disk
Carlyle Johnson Machine Co., Manchester, Conn.
DODGE MFG. CORP., Mishawaka, Ind.
Hilliard Corp., 102 W. Fourth St., Elmira, N. Y.
Industrial Clutch Corp., 515 Frederick St., Waukesha, Wis.
Lipe-Rollway Corp., 208 S. Geddes St., P. O. Box 1106, Syracuse 1, N. Y.
Rockford Clutch Div., 1300 18th Ave., Rockford, Ill.
TWIN DISC CLUTCH CO., Racine, Wis.

Clutches, Magnetic
CUTLER-HAMMER, INC., 126 St. Paul Ave., Milwaukee 1.
DINGS MAGNETIC SEPARATOR CO., 4800 McGeogh Ave., Milwaukee 14.
Magnetic Engineering & Mfg. Co., Van Houten Ave., Clifton, N. J.
STEARNS MAGNETIC MFG. CO., 635 S. 28th St., Milwaukee 4.

Coal, Coking
INLAND STEEL CO., 38 S. Dearborn St., Chicago 3.

Coal Handling Systems
Link-Belt Co., 2410 W. 18th St., Chicago 8.
McCrosky Tool Corp., Meadville, Pa.

Coal, Pulverizing Systems
Blaw-Knox Co., Farmers Bank Bldg., Pittsburgh 1.
KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19.
Smidth, F L., & Co., 11 W. 42nd St., New York 18.

Coal Tar
KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19.

Coating, Acid Proof
Bakelite Corp., 300 Madison Ave., New York 17.

Coatings, Permanent Mold
Wheeler Consultancy, Inc., 380 Dwight St., Holyoke, Mass.

Coatings, Plastic, Paint, Lacquer
BETTER FINISHES & COATINGS, INC., 268 Doremus Ave., Newark 5, N. J.
FLINTKOTE CO., 30 Rockefeller Plaza, New York 20.
HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J.
HOLLINGSHEAD, R. M., CORP., Camden, N. J.
INDUSTRIAL METAL PROTECTIVES, INC., 137 No. Perry St., Dayton 2.
LOWE BROS. CO., East 3rd St., Dayton 2.
Monsanto Chemical Co., Plastic Div., Springfield 2, Mass.
NATIONAL LEAD CO., 111 Broadway, New York 6.
NEW WRINKLE, INC., 137 North Perry St., Dayton 2.
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BUYERS GUIDE

Cocks, Lubricated Plug

American Car & Foundry Co., 30 Church St., New York 8.
Weatherhead Co., 300 E. 13th St., Cleveland 8.

Coiling Machines

ADVANCE CAR-MOVER CO., 112 No. Outagamie St., Appleton, Wis.
FARREL-BIRMINGHAM CO., INC., Ansonia, Conn. & 344 Vulcan St., Buffalo 7.
Fessler Machine Co., 405 Commonwealth Bldg., Pittsburgh.
KANE & ROACH, INC., Syracuse, N. Y.

Coke, Foundry

DeBardeleben Coal Corp., 2200 First Ave., Birmingham 3.
PICKANDS, MATHER & CO., Cleveland 14.
Republic Coal & Coke Co., 12 S. Michigan Ave., Chicago 3.
Semet-Solvay Co., 40 Rector St., New York 6.

Coke, Metallurgical

Alabama By-Products Corp., Birmingham.
Columbia Steel Co., Russ Bldg., San Francisco.
Connecticut Coke Co., New Haven, Conn.
INLAND STEEL CO., 38 S. Dearborn St., Chicago 3.
Interlake Iron Corp., Union Commerce Bldg., Cleveland 14.

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KOPPERS CO., INC., Koppers Bldg., Pittsburgh 19.

Collets and Machine Tool Attachments

BROWN & SHARPE MFG. CO., Promenade St., Providence 1.
CUSHMAN CHUCK CO., Windsor St., Hartford.
GENERAL DIE & STAMPING CO., 265 Mott St., New York 12.
Gorton, George, Machine Co., Racine, Wisc.
GREENFIELD TAP & DIE CORP., Sanderson St., Greenfield, Mass.
HARDINGE BROS., INC., Anderson St., Elmira, N. Y.
KEARNEY & TRECKER CORP., National Ave., Milwaukee 14, Wis.
Modern Collet & Machine Co., 401 Salliotte St., Detroit 18.
Parker Stearns & Co., Sheffield Ave., Brooklyn.
Rivett Lathe & Grinder, Inc., 18 Riverview Rd., Brighton, Boston 35.
SOUTH BEND LATHE WORKS, 421 Madison St., South Bend 22, Ind.
STANDARD TOOL CO., 6920 Central Ave., Cleveland.
Thompson Tool Div., Maguire Industries, Inc., Railroad Ave., Bridgeport, Conn.
Union Twist Drill Co., Weloy St., Athol, Mass.
VAN NORMAN CO., Main St., Springfield 7, Mass.
Wayne Pump Co., 740 Canal St., Ft. Wayne, Ind.

Coloring Compositions
(See Rouges, Coloring Limes)

Columbium Alloys

CARPENTER STEEL CO., 321 W. Bern St., Reading Pa.
ELECTRO METALLURGICAL CO., 30 E. 42nd St., New York 17.
FANSTEEL METALLURGICAL CORP., North Chicago, Ill.
Metal Hydrides, Inc., 16 Congress St., Beverly, Mass.

Combustion Controls

Delco Appliance Div., General Motors Corp., 391 Lyell Ave., Rochester 1, N. Y.
Eclipse Fuel Engineering Co., 814 S. Main St., Rockford, Ill.
LEEDS & NORTHRUP CO., 4956 Stenton Ave., Philadelphia 44.
MASTER ELECTRIC CO., Aircraft & Electrical Controls Div., 126 Davis Ave., Dayton 1.
North American Mfg. Co., 2910 E. 75th St., Cleveland 4.

BUYERS GUIDE

Combustion Tubes

Eberbach & Son Co., Inc., Ann Arbor, Mich.

MICHIANA PRODUCTS CORP., Michigan City, Ind.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh, Pa.

YOUNGSTOWN WELDING & ENGINEERING CO., 3800 W. Oakwood Ave., Youngstown 9.

Communications Systems

TelAutograph Corp., 16 W. 61st St., New York 23.

Western Electric Co., Inc., 195 Broadway, New York 7.

Comparators, pH

Beam-Knodel Co., 195 Lafayette St., New York 12.

Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4483 Wayne Ave., Philadelphia 44.

Burrell Technical Supply Co., 1942 Fifth Ave., Pittsburgh 19.

Eberbach & Son Co., Inc., Ann Arbor, Mich.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J.

Knowles, F. S., 77 W. Washington St., Chicago 2.

Kocour Co., 4800 S. St. Louis Ave., Chicago.

LEEDS & NORTHRUP CO., 4956 Stenton Ave., Philadelphia 44.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens, Frederic B., Inc., 510 Third St., Detroit 26.

Composite Metals and Materials

ALLEGHENY LUDLUM STEEL CORP., Brackenridge, Pa.

Detroit Seamless Steel Tubes Co., Box A, Grand River Sta., Detroit 8.

HASKELITE MFG. CORP., 701 Ann St. N.W., Grand Rapids 2.

JESSOP STEEL CO., Washington, Pa.

WESTINGHOUSE ELECTRIC CORP., P. O. Box 868, East Pittsburgh, Pa.

Compounds, Burnishing and Tumbling

Allied Industrial Products Co., 620 North Michigan Ave., Chicago 11.

Beam-Knodel Co., 195 Lafayette St., New York 12.

Enthone, Inc., 442 Elm St., New Haven 11, Conn.

Fidelity Chem. Prod. Corp., 430 Riverside Ave., Newark 4, N. J.

Magnus Chemical Co., South Ave., Garwood, N. J.

PENNSYLVANIA SALT MFG. CO., 1000 Widener Bldg., Philadelphia 7.

Puritan Manufacturing Co., Waterbury, Conn.

Quaker Chemical Products Corp., Conshohocken, Pa.

Sommers Bros. Manufacturing Co., 3439-41-43 No. Broadway, St. Louis 7.

Stevens, Frederic B., Inc., 510 Third St., Detroit 26, Mich.

Turco Products, Inc., P. O. Box 2649 Terminal Annex, Los Angeles 54.

WYANDOTTE CHEMICALS CORP., Wyandotte, Mich.

Compounds, Drawing and Cutting

Allied Industrial Products Co., 620 North Michigan Ave., Chicago 11.

American Lanolin Corp., 13 Railroad Ave., Lawrence, Mass.

Beals, McCarthy & Rogers, Inc., 50 Terrace, Buffalo 5.

Carbide & Carbon Chemicals Corp., 30 East 42nd St., New York 17.

Filmite Oil Corp., 12733 W. Arden Place, Milwaukee 10.

Ironsides Co., P. O. Box 1999, Columbus 16.

Magnus Chemical Co., South Ave., Garwood, N. J.

Pure Oil Co., 35 E. Wacker Dr., Chicago 1.

Quaker Chemical Products Corp., Conshohocken, Pa.

(TO BE CONTINUED)

Broader Tin Controls Under Consideration At Commerce Request

Washington

• • • **New controls** over tin, estimated to result in conservation of about 2750 tons of the scarce metal in 1948, are being considered by Congress at the request of the Commerce Dept.

Present controls over the use of tin expire on Feb. 29 with termination of the old Export Control Act. New export controls, contained in the Taft-Wolcott allocation bill, do not provide for tin controls.

The Commerce Dept. program would, if enacted into law, restrict 1948 use of tin in can making by individual manufacturers to no more than was contained in the form of tinplate coating they received during 1947 for making cans.

A policy statement issued by the department states that can manufacturers will be expected to (1) make adequate provision for the food pack, and (2) make equitable distribution among and within various groups of can users, including special consideration for small business and hardship cases, and reasonable provision for newcomers.

Specifically, the new order would prohibit any person from using more tinplate coating for beer cans in 1948 than he used for that purpose in 1947. In the case of animal foods, the order would prohibit any person from using more tinplate coating in 1948 than 75 pct of the amount of tin he used for this purpose in 1947 or 1941, whichever is larger. The latter adjustment is to reflect reduction of tin coating from a 1.25-lb tinplate basis during 1941 to a 0.25-lb tinplate basis as now permitted. Commerce Dept. officials explained.

The new program also would add the following restrictions to those already set forth in the existing tin order, M-81, animal foods, no tinplate ends for cans; coffee, no tinplate cans; motor lubricating oils, no 1-qt round refinery-sealed tinplate cans [however, cans of that type made from SCMT—terneplate—may be used], pigmented oil paints, no cans with a tin coating above 0.25 lb per base box (as an alternative, cans made from SCMT may be used).

The Practical Aspects Of Metal Spinning

(CONTINUED FROM PAGE 80)

pierced by means of a press die. Frequently, combination operations between spinning and press forming will greatly reduce the cost of an article which had been originally designed for press forming since much of the tool cost is obviated. Depending upon requirements, it may be most desirable to use spinning for later operations on a press drawn product for processes of finishing, outside flanging or beading. Other mechanical operations are also readily associated with spun shapes. These include lathe cutting, drilling, hand forming, milling, sawing, punching and welding. Many interesting shapes have been created by using segments of spherical or oval spun shapes welded together with press or hand-formed parts. By such means, machinery covers, automotive bodies, and other intricate shapes are created. A combination of spinning, hand forming and riveting produced the helicopter shield shown in fig. 4.

Spun work may be readily finished in any manner suitable to the type of material which is used. Such finishes include painting, plating or some of the new color anodized surfaces. High gloss polished surfaces may be obtained through buffing. Ridged or irregular surfaces in artistic patterns may be easily accomplished by spinning the object under contact with steel wool or emery. Occasionally such surfaces may be used not only for their artistic value, but also to enable the spinner to obtain jewelry finishes on commercial grades of raw material.

The spinning method is naturally suited for model and sample work and is frequently used for making such tools or molds as are used in plastic formation. Products made of material as heavy as ¼ in., and even heavier, cold-rolled steel have been successfully spun.

The bread and butter of the spinning trade has been in products such as aircraft components, air-conditioning outlets or air diffusers like the ones in fig. 5, cooking utensils, lamp shades, hollow silverware, oil, gas and milk tanks, and tank ends for trucks used in the dairy and food industries. Other

◆—FEATURE CONTINUATION—

products include components of food machinery, parabolic radar antennas, street, airport and store window types of lighting reflectors, machinery covers, and similar products.

Spinning is a useful process for the manufacture of large and small size bezels or connectors for air ducts, exhaust ducts, etc. Considerable use is made of spun components joined by welding in the manufacture of modern equipment covers where rounded corners are desired, such as on laundry, refrigeration and food handling equipment. Modern design and modern metals suggest economical uses for spinning in many product designs which range from champagne coolers to office machinery and from jewelry to industrial pressure tanks.

Low Temperature Treatment of Steel

(CONTINUED FROM PAGE 73)

increases to 77 pct after having been subjected to —155°F. Thus, the low temperatures are somewhat more effective on type D than type C. The same results were obtained with type D whether an oil quench or air cool was employed.

Fig. 5 shows some of the transformation characteristic for type 440C stainless steel, the composition of which is shown in table II as type E. This is another alloy which requires a high austenitizing temperature and possesses a critical cooling rate sufficiently slow so that it usually can be either oil quenched or air cooled. This particular alloy has a great tendency to retain austenite in high percentages even to the point of remaining almost completely austenitic after cooling to room temperature in cases where the austenitizing temperature was abnormally high.

The M_s temperature occurs at approximately 470°F for type E steel after austenitizing at 1950°F. As in case of the other alloys under discussion, the formation of martensite takes place with increasing speed as room temperature is approached. The tendency of this alloy to retain austenite is well illustrated by the fact that only 55 pct transformation is effected at room temperature. This amount increases to 64 pct after subjecting to —155°F. The low temperature

is evidently less influential on type E than type D, even though the percent of retained austenite is greater in type E

In a subsequent issue, the author will present data indicating the effects of austenitizing temperature and tempering temperature on austenite transformation. —Ed.

U. S. Steel and Inland Steel Join University Of Chicago Research

Chicago

••• **U. S. Steel Corp.** and Inland Steel Co. have become the eighth and ninth business partners in the University of Chicago's atomic and metal research program, Chancellor Robert M. Hutchins has announced.

Dr. Hutchins said that these firms have joined seven other leading industries in helping to finance the university's $12 million research program in the Institute for Nuclear Studies, Institute of Metals and Institute of Radiobiology and Biophysics. Five of them, he stated, have become members in 5 weeks.

The university's industrial membership plan, Dr. Hutchins said, offers companies an ideal means of obtaining basic scientific knowledge which will lead to new products, processes and economies.

To become a participating member, industrial concerns have two choices: They can join all three institutes at $50,000 a year for 5 years, or they may join only one institute at $20,000 a year.

In return for this investment, Dr. Hutchins explained, members receive advance reports on all phases of research and they participate in quarterly conferences to discuss progress and techniques.

The university, he said, does not intend to patent any of its developments unless it would be of general benefit to mankind. This gives members a tremendous advantage on any industrial applications which may result from contact with university scientists and metallurgists.

Present members are Standard Oil Co. of Ind., Westinghouse Electric Manufacturing Co., Pittsburgh Plate Glass Co., Shell Oil Co., Aluminum Co. of America, Sun Oil Co., U. S. Steel Corp., Standard Oil Development Co. of New Jersey, and Inland Steel Co.

MACHINE TOOLS

. . . News and Market Activities

Confusion Seen as Result of Drop in Grain and Commodity Markets

• • • **Considerable confusion** seems apparent in major machine tool markets as a result of last week's break in the commodity market.

Some sources, fearing the worst, predict a 60-day lull in machine tool buying because of the grain drop and the spread of new firm orders brought out by the machine tool price increases.

Other sources, professing considerable faith in the fiscal structure, report a considerable amount of long term buying on the part of major users. It is generally agreed that the buying programs of some of the larger companies are being given another scanning, but quotations are going out in volume and generally to companies in a well-heeled condition. A lot of revamping is going on, which is also reflected in the inquiries.

Some sources in the machine tool industry are more or less secretly banking on about $200 million worth of business for the industry from the Marshall Plan, expectations which seem unlikely to those close to the stove in Washington.

However, if the Marshall Plan should provide the machine tool industry with $200 million of comparatively unexpected new firm orders, 1948 would be a vastly better year for most segments than 1947, when the entire industry did about $269 million worth of business, of which $71 million was foreign. Of $233 million new firm orders in 1947, about $51 million were from foreign customers, which would seem to indicate that business on the domestic front was not exactly of boom proportions in 1947.

In Cleveland, one of the bellwethers of the industry, Warner & Swasey Co., last week reported a net operating loss for the year 1947 of $297,387 which, after a tax carry-back refund of $175,000, left a net loss of $122,387.

This compares to a net operating loss of $162,109 for 1946, which, after a tax carry-back refund, resulted in a net loss for that year of $32,109.

Some Predict Lull in Machine Tool Buying Because Of Increased Prices

o o o

Sales for 1947 totaled $14,705,571, compared to $15,444,569 in 1946. Sales of products other than machine tools rose from $1,812,818 in 1946 to $4,563,829 in 1947. Machine tool sales, however, declined from $13,631,751 in 1946 to $10,141,742 in 1947.

Inventories showed a reduction of approximately $300,000 during the year.

Discussing the current outlook for the company, Charles J. Stilwell, president, Warner & Swasey Co., stated in his letter to the company's shareholders that "considerable progress has been made in the development of postwar products."

"Probably the most important aspect of postwar products was the work done in the textile machinery field; the pin drafting machine is receiving wide acceptance in the textile industry and . . . in the last quarter of 1947 more units of pin drafting machines were sold than of machine tools.

"It would appear that our production and sales of this item will expand and be a source of more volume and profit in 1948," Mr. Stilwell added.

"The engineering of the American version of the Sulzer weaving machine was completed during the year and in order to test our design, five pilot machines were built. After testing in the early months of 1948, tooling will be designed and built and this machine should start into production in the latter part of the year," Mr. Stilwell stated.

While Warner & Swasey will continue to place major emphasis on machine tools, Mr. Stilwell pointed out that the possibilities for diversification and added production "in this shop through the manufacture of textile machinery in the years to come is very encouraging."

In Detroit a survey of machine tool builders and distributors indicates that the accelerated tempo of the past 2 months is continuing. Tool and die shops here producing large dies for Ford and Chrysler are jammed with work at the moment, although activity in many of Detroit's smaller shops appears to be lagging somewhat at present.

A recent upsurge in the volume of cutting tool orders has increased the tempo in this segment of the industry, although Detroit's present gas shortage is expected to retard deliveries appreciably unless relief comes in the very near future.

The most important tooling programs in the industry at the moment are an extensive program at Dodge forge and Kaiser-Frazer's new engine program for Willow Run. While orders have not been placed for this equipment, it is entirely possible that the next 2 or 3 weeks will see the letting of contracts.

In addition, Ford is said to be making some extensive investments in tooling for its new Mound Road plant. It will be recalled that a substantial amount of the Mound Road equipment was originally purchased through WAA.

Machine tool builders producing transfer-type equipment are sometimes finding themselves at a competitive disadvantage because of uncertain deliveries of integrated machines, it is reported. Where suppliers of individual machines can make speedier delivery, it sometimes happens that the savings that might be realized from transfer operations may be passed up in favor of quicker delivery of individual type machines.

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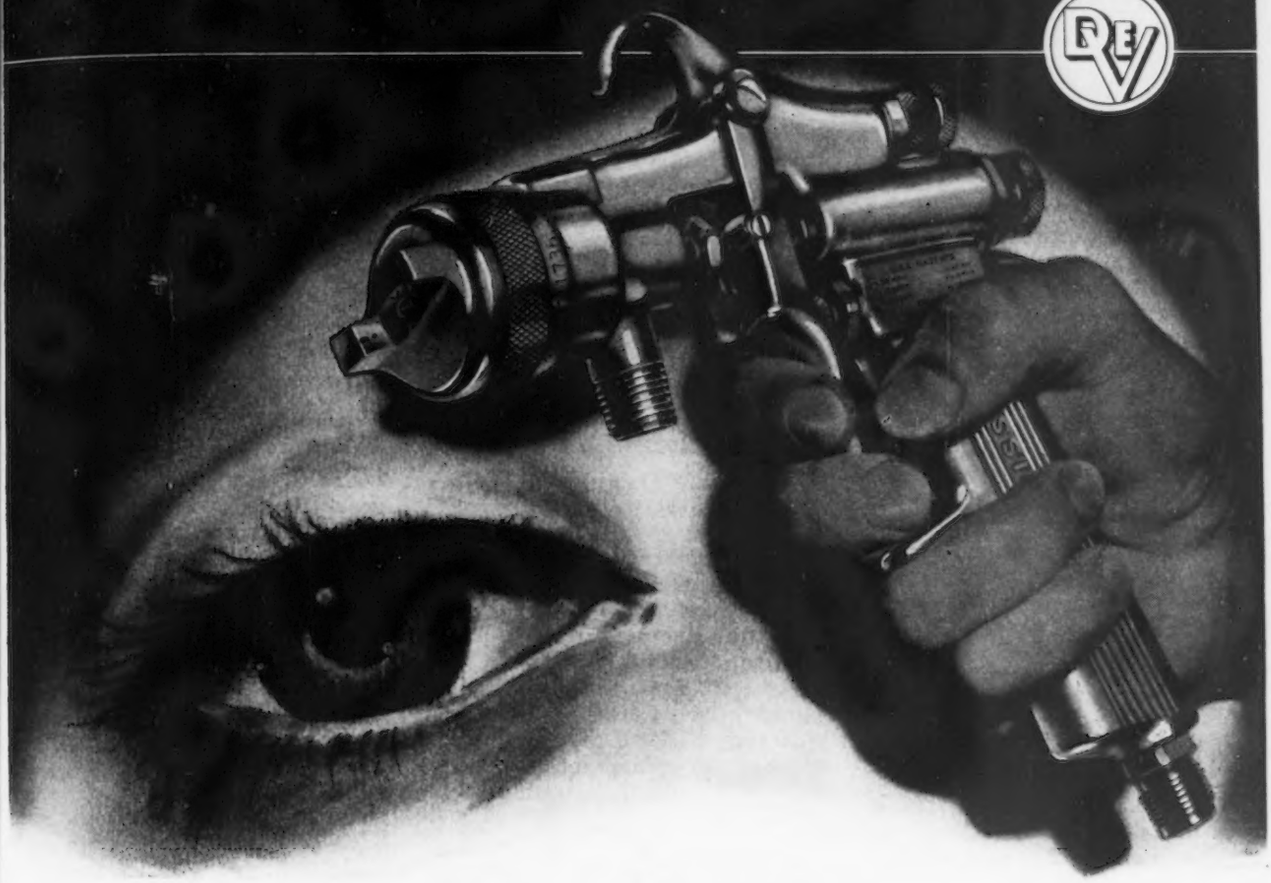

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NONFERROUS METALS

. . . News and Market Activities

Brass Scrap Prices Drop

New York

• • • **Dealers' buying** prices for some grades of brass scrap were dropped by ¼¢ to ½¢ per lb last week. Copper items and brass mill stock grades were unchanged, although it is understood that refineries are now considering the possibility of reducing their buying prices which would serve to bring down the prices of copper grades. Ingot makers are still out of the scrap market and current dealer reductions reflect a decrease in ingot makers buying prices by 1¢ per lb. During the week there was a flurry of demand for mill stock items which served to maintain the market. Other scrap metals were unchanged.

•

Lower Brass Ingot Prices

New York

• • • **A major producer** of brass and bronze ingots has announced price decreases of 1¢ to 1¼¢ per lb effective Feb. 6. The move is said to have been made possible by recent decreases in scrap copper and brass resulting from the volume of scrap being brought out by current high prices. Ingot buying volume has dropped appreciably following the four price increases in ingots since Nov. 24. Current price decreases are 1¼¢ on the 85-5-5-5 and 80-10-10 groups, 1¢ on 88-10-2, yellow, nickel alloy, aluminum bronze, manganese and silicon bronze groups.

•

Raise Aluminum Ingots

New York

• • • **Aluminum ingot** prices have been advanced by ¼¢ to ½¢ per lb by a major producer effective Feb. 5. The higher increase applies to the aluminum-silicon alloys. There is no change in the price of AXS 679. The price increases are the result of higher production costs, including higher prices for fuel and refractories, and higher freight rates. In addition there are higher costs involved in operations during the severe winter weather. Aluminum scrap prices are reported to be unchanged.

•

Propose Subsidies At Denver Meeting

New York

• • • **A number of** proposals for subsidies on minerals production were presented last week in Denver at the meeting of the Colorado Mining Assn. According to reports from some members of the industry who were present, there was very little discord despite a division of opinion on the most desirable form of subsidy program.

The smaller western miners proposed subsidy plans to provide incentives for exploration. Operators of high cost mines already fully developed proposed plans designed to encourage marginal production for purposes of conservation. There were others who definitely opposed the granting of any subsidies, but their opinion is reported to have been in the minority. A combination of the two objectives was agreed upon in principle and it was left for a joint committee of mining associations to work out the details for presentation to Washington.

Much of the discussion of subsidies took place before Senator Malone of the Senate Public Lands Committee. Donald H. McLaughlin of Homestake Mining Co., chairman of the Krug Minerals Advisory Committee, indicated that there would probably be an early meeting of the whole committee, perhaps at the time of the February meeting of the AIME in New York.

•

Metals Demand Strong

New York

• • • **Consumer demand for** major nonferrous metals continued at peak levels last week despite weakness shown by the commodity and stock markets. Producers were alloting supplies to consumers on the basis of available tonnages. Foreign demand for copper and zinc was reported to have declined somewhat during the week, probably reflecting an underestimate of the strength of the domestic metals markets as affected by commodity and stock price declines. Consumers who have been unable to obtain antimony or high grade zinc from producers could obtain their requirements from the office of Metals Reserve, who have stocks of these metals as yet not earmarked for the strategic stockpile. Prices of all metals remained unchanged.

•

Orders New Roll Lathes

Pittsburgh

• • • **To increase** production of steel mill rolls, Mackintosh-Hemphill Co., Pittsburgh, has ordered two specially designed automatic lathes. These lathes will machine finish, ready for mill installation, steel back-up rolls for continuous strip mills, as well as slabbing and cogging mill steel rolls for blooming mills. It is part of a $75,000 Midland, Pa., plant improvement project.

This first 1948 order for improved plant equipment has been given to the machinery division of Mackintosh-Hemphill Co., which will construct the lathes at the Pittsburgh South Side plant on Bingham Street.

Nonferrous Metals Prices

Cents per pound

	Feb. 4	Feb. 5	Feb. 6	Feb. 7	Feb. 9	Feb. 10
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	12.00	12.00	12.00	12.00	12.00	12.00
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point, freight allowed	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$40.00
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.65 to $1.72
Copper electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$80 to $90
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	$77 to $79
Nickel, electro, f.o.b. New York	36.56¢
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	74.625
Tin, Grade A, New York	94.00
Zinc, East St. Louis	12.00
Zinc, New York	12.61
Zirconium copper, 6 pct Zr, per lb contained Zr.	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.00-19.25
No. 120	18.50-18.75
No. 123	18.00-18.25
60-10-10 ingot	
No. 305	24.25
No. 315	21.75
88-10-2 ingot	
No. 210	30.00
No. 215	28.00
No. 245	21.75-22.75
Yellow ingot	
No. 405	15.00-16.00
Manganese Bronze	
No. 421	18.00

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	17.50-17.75
0.60 copper, max.	17.25-17.50
Piston alloys (No. 122 type)	16.50-16.75
No. 12 alum. (No. 2 grade)	16.25-16.75
108 alloy	16.25-16.50
195 alloy	16.50-16.75
AXS-679	16.50-17.00
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-95½ pct	16.50-17.00
Grade 2—92 pct-95 pct	16.00-16.50
Grade 3—90 pct-92 pct	15.50-16.00
Grade 4—85 pct-90 pct	15.25-15.50

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37¾
Electrodeposited	32¾
Rolled, oval, straight, delivered	33.09
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	33¾
Zinc, cast, 99.99	20.50
Nickel 99 pct plus, frt. allowed	
Cast	51
Rolled, depolarized	52
Silver 999 fine	
Rolled, 1000 oz lots per troy oz.	67¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulfate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt. allowed	14.50
Silver cyanide, 100 oz lots, per oz.	54.00
Sodium cyanide, 96 pct domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc sulfate, 89 pct, granules, bbls, frt. allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall; 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75-S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness; 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled. B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢, 10,000 lb base. B & S gage 00-1; 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill, freight allowed. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in. 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢; 38 to 40, 75.5¢; 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 27¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢; 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets		41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, lcl.	16.50-17.00
Ribbon	15.25-16.00
Plates	
Small	14.25
Large, over 12 in.	15.25

Copper, Brass, Bronze

Cents per pound, freight prepaid on 200 lb.

	Extruded Shapes	Rods	Sheets
Copper	33.53	...	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.36*	31.39	31.70
Yellow brass	32.92*	29.85	30.16
Red brass	34.89*	31.92	32.23
Naval brass	30.28	29.03	34.97
Leaded brass	28.64	24.69	....
Commercial bronze	35.68*	32.96	33.27
Manganese bronze	33.87	32.37	38.47
Phosphor bronze, 5 pct	53.95*	52.95	52.70
Muntz metal	29.80	28.55	32.99
Everdur, Herculoy, Olympic, etc.	37.24	37.50	38.56
Nickel silver, 10 pct.	41.80	42.68	40.54
Architectural bronze	28.61	....	....

*Seamless tubing.

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 lb or more.)

	Heavy	Turnings
Copper	19¼	18⅝
Yellow brass	15⅝	14¾
Red brass	17½	16¾
Commercial bronze	17⅝	16⅞
Manganese bronze	15¼	14⅝

(Dealers' buying prices, f.o.b. New York in cents per pound.)

CUSTOM SMELTERS' SCRAP

(Cents per pound, carload lots, delivered to refinery.)

Copper	
No. 1 copper, wire	18.50
No. 2 copper, wire	17.50
Light copper	16.50
Refining brass	15.75*
Aluminum	
Mixed old cast	9.75
Mixed old clips	9.75
Mixed turnings	9.00
Pots & pans	10.00
Low copper	10.50

*Dry copper content

INGOT MAKERS' SCRAP

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	18.25
No. 2 copper, wire	17.25
Light copper	16.25
No. 1 composition	14.75
No. 1 comp. turnings	14.50
Rolled brass	12.00
Brass pipe	12.00
Radiators	12.00
Heavy yellow brass	10.75

COPPER AND BRASS

No. 1 heavy copper and wire	16½—17
No. 2 heavy copper and wire	15½—16
Light copper	14 —14½
Auto radiators (unsweated)	9 — 9½
No. 1 composition	11½—12
No. 1 composition turnings	11 —11½
Clean red car boxes	9¼— 9¾
Cocks and faucets	9¼— 9½
Mixed heavy yellow brass	7 — 7½
Old rolled brass	7½— 8
Brass Pipe	9¼— 9½
New soft brass clippings	11¼—11¾
Brass rod ends	9¾—10¼
No. 1 brass rod turnings	9¼— 9¾

ALUMINUM

Alum. pistons with struts	4½— 5
Aluminum crankcases	6½— 7
2S aluminum clippings	9 — 9½
Old sheet & utensils	7 — 7½
Mixed borings and turnings	— 2
Misc. cast aluminum	6½— 7
Dural clips (24S)	6 — 6½

ZINC

New zinc clippings	7 — 7½
Old zinc	5 — 5½
Zinc routings	3 — 3½
Old die cast scrap	3 — 3½

NICKEL AND MONEL

Pure nickel clippings	16 —17
Clean nickel turnings	12½—13
Nickel anodes	16 —17
Nickel rod ends	16 —17
New Monel clippings	12 —13
Clean Monel turnings	7 — 8
Old sheet Monel	10 —10½
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
Nickel silver clippings, mixed	8 — 8½
Nickel silver turnings, mixed	6½— 7

LEAD

Soft scrap lead	12 —12⅛
Battery plates (dry)	7 — 7½

MAGNESIUM ALLOYS

Segregated solids	7½— 8
Castings	4½— 5½

MISCELLANEOUS

Block tin	75 —77
No. 1 pewter	60 —62
No. 1 auto babbitt	45 —47
Mixed common babbitt	13½—14
Solder joints	16½—17
Siphon tops	45 —47
Small foundry type	16 —16½
Monotype	15 —15½
Lino. and stereotype	14 —14½
Electrotype	11½—12
New type shell cuttings	14½—15
Clean hand picked type shells	6½— 7
Lino and stereo dross	6½— 7
Electro dross	4½— 5

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SCRAP

Scrap Easier to Buy This Week

New York

• • • There were indications in the market this week that it was somewhat easier to buy scrap on the formula basis. Brokers were talking in somewhat hushed tones of the possible effects of the commodity break—and speculating on the future trend of scrap prices. Mills are now reporting big scrap purchases gleefully in splash press releases.

Although some sources are dubious as to the exact quantities involved, the major consumers have re-entered the market for dealer scrap this week, despite the difficulty in shipments in winter weather.

There are a number of indications that mills are returning to the practice of segregating strictly No. 1 scrap for fussy consumers. The trade has been reluctant to call this material No. 1, with some obvious anxiety to leave existing price structures alone.

Still twisting uncomfortably under the pressure due to the pig iron shortage, cast scrap grades now stands at still higher levels. There are indications that the high prices now being paid are driving some foundries out of the market, and some local price adjustments have been made. The trend is still up, however. In some areas, foundry buying of No. 1 steelmaking scrap was driving the price for that grade to above ceiling levels.

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PITTSBURGH—No. 1 factor still ruling the market was the recent purchase by Carnegie-Illinois of more than 100,000 tons of openhearth steel scrap at the formula price of $40.50. This means that local material will move at $40.50 while that from out of the district will cost more. The material was acquired within the past few weeks, a good part of it at the end of last week. It is said to consist entirely of free market dealer scrap and doesn't include any material due from customers. Delivery is reported to be 30 and 45 days. Such a purchase would not be considered too unusual in the spring but it is believed that recent weakness in the commodity markets permitted the clock to be turned back by almost 2 months. Railroad scrap rails moved up another 50 cents and cupola cast was $1 higher.

CHICAGO—Large purchases last week at formula prices were largely free market scrap. The tonnage figures published by the mills, which were bought at $39.50 a gross ton delivered, did not include any railroad material. The mills expect that the brokers may fill part of these orders with earmarked steel consumer scrap. Railroad specialty scrap was in a confused state, although the railroad specialty prices were expected to be clarified by the free list which closed later in the week. There were good indications that the bottom had fallen out of the railroad specialty prices but representative prices could not be ascertained early in the week. So far the cast iron prices are generally held near former levels although some softening is expected even here.

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PHILADELPHIA—New orders for No. 1 were not placed last week but some brokers were still buying to fill the $46 orders outstanding. Sales of other grades of heavy melting were made during the week at $40, a dollar decrease. Brokers' buying prices for turnings were 50¢ lower, widening the spread to $1. Cast grades, except heavy breakable, were selling three to five dollars a ton above the last quotations. Yard receipts are reported to be in low volume and shipments to mills are reported only fair.

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CLEVELAND—Buyers are beginning to wonder if there is enough scrap around to justify the tremendous sales, at formula prices, reported during the past few days. In any event, there is no talk of price softness, synthetic or genuine, among buyers in this area, and it is believed by some trade sources that the formula prices are going to hold for some time to come. Others feel the drop in the commodity market is a sign that scrap has hit its peak. At the same time, some consumers, more or less of major stature, are paying more than formula prices for material.

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DETROIT—There were at least two strong indications this week that the formula has been accepted in Detroit after strong resistance by scrap sellers. Despite adverse weather and extensive plant shutdowns resulting from the critical gas shortage the flow of scrap was reported to be easier. Also, there were persistent reports that brokers were going short on the market for the first time in weeks. Meanwhile, cast grades continue to exhibit strength as foundries are being forced into the market to replenish their dwindling supplies.

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BIRMINGHAM — Following the break on the grain and stock exchanges, the scrap market here is marked by a softer undertone. At the beginning of the week openhearth grades were moving at the lid price of $37.50 but shipments at that price were on prior commitments. A lot of material was being turned loose and Republic Steel Corp., heaviest user of scrap in Alabama, was reported putting down tonnages on the yard for the first time in months.

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BUFFALO — The slide in commodities and heavy sales in other centers at the formula cooled off some of the extreme bulls here, but failed to unsettle prices. The double standard continued in effect, with leading mills buying at the ceilings, while foundries and other consumers paid premium prices. No. 1 heavy melting was reported stronger at an increase of $2 to $3 a ton. Strictly low phos plate sold at $48 to $50, and mixed cupola cast at $60 to $62. The last item showing a sharp advance over recent quotations. Rail shipments were slowed by bad weather, and one of the leading openhearth consumers was reported charging scrap virtually "off the cars."

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NEW YORK — There were indications that large scale buying by major consumers was resumed here at the end of last week, at formula levels. Brokers were a little dubious on the ability of yards to ship enough scrap while the snow is still heavy in this district, but some reported heavy sales. Cast grades continued their months-old upward price drive, hitting $60 for mixed grades here.

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BOSTON — Big mills continue to hold at $31.65 to $31.90 f.o.b. for heavy melting steel, generally $31.65, but practically nothing is moving to Pittsburgh or eastern Pennsylvania. The American Steel & Wire Co., Worcester, has bought a small tonnage on this basis. A Massachusetts consumer is buying shoveling turnings, when it can get them, at $31, and one small lot of machine shop turnings has gone to the Pittsburgh area at $31. Foundries will pay almost any price for cast, but are unable to buy.

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CINCINNATI—Very little trading is going on in the market here, although mills will take all the material they can get at formula prices. There is a great deal of caution being displayed by most segments of the trade, but demand for foundry grades is still strong. Brokers hint of a sympathetic softness which might develop in the openhearth grades as a result of the grain drop last week. In the meantime, if a consumer bought a representative tonnage at over-formula prices, the apple cart would be badly upset.

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ST. LOUIS—The only sign of the effect of the drop in commodity prices in this market was the offering of Chicago brokers of No. 2 heavy melting steel to mills in the district at the formal price but this is said to have caused the mills to halt buying. One large operator announced that it is out of the market. There was some improvement in the movement of scrap to this market. Some foundry grades were off $1 to $2 a ton.

•

TORONTO — General conditions show little change in the Canadian scrap markets. Supply of all types of scrap is seriously short and steel mills have been depending largely on imports to meet requirements as domestic supply is less than 25 pct of needs.

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.50
RR. hvy. melting	$41.00 to 41.50
No. 2 hvy. melting	40.50
RR. scrap rails	54.00 to 55.00
Rails 2 ft and under	58.00 to 59.00
No. 1 comp'd bundles	40.50
Hand bdld. new shts.	40.50
Hvy. axle turn.	41.50 to 42.00
Hvy. steel forge turn.	41.50 to 42.00
Mach. shop turn.	35.00 to 35.50
Shoveling turn.	38.50 to 39.00
Mixed bor. and turn.	37.00 to 37.50
Cast iron borings	38.00 to 39.00
No. 1 cupola cast.	58.00 to 59.00
Hvy. breakable cast.	44.00 to 45.00
Malleable	66.00 to 67.00
RR. knuck. and coup.	53.50 to 54.50
RR. coil springs	53.50 to 54.50
RR. leaf springs	53.50 to 54.50
Rolled steel wheels	53.50 to 54.50
Low phos.	47.00 to 48.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50
No. 2 hvy. melting	39.50
No. 1 bundles	39.50
No. 2 dealers' bundles	39.50
Bundled mach. shop turn.	39.50
Galv. bundles	37.50
Mach. shop turn.	$34.00 to 34.50
Short shov. turn.	36.00 to 36.50
Cast iron borings	35.00 to 35.50
Mix. borings & turn.	34.00 to 34.50
Low phos. hvy. forge	46.50 to 47.00
Low phos. plates	41.50 to 45.00
No. 1 RR. hvy. melt.	41.25 to 41.75
Rerolling rails	49.50 to 50.00
Miscellaneous rails	50.00 to 53.00
Angles & splice bars	51.00 to 52.00
Locomotive tires, cut	52.00 to 53.00
Cut bolster & side frames	45.00 to 48.00
Standard stl. car axles	57.00 to 58.00
No. 3 steel wheels	51.00 to 51.50
Couplers & knuckles	52.00 to 55.00
Rails 2 ft and under	55.00 to 57.00
Malleable	70.00 to 73.00
No. 1 mach. cast.	64.00 to 65.00
No. 1 agricul. cast.	62.00 to 63.00
Heavy breakable cast.	55.00 to 60.00
RR. grate bars	60.00 to 62.00
Cast iron brake shoes	60.00 to 61.00
Cast iron carwheels	58.00 to 60.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	38.50 to 39.50
No. 1 bundles	38.50 to 39.50
No. 2 bundles	38.50 to 39.50
Mach. shop turn.	33.00 to 33.50
Shoveling turn.	35.00 to 35.50
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	50.00 to 51.00
No. 1 cupola cast	67.00 to 68.00
Hvy. breakable cast	57.50 to 60.00
Rails 18 in. & under	61.00 to 65.00
Rails random length	55.00 to 57.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$33.00 to $35.00
No. 2 hvy. meltign	31.65 to 31.90
Nos. 1 and 2 bundles	31.65 to 31.90
Busheling	31.65 to 31.90
Shoveling turn.	30.00 to 31.00
Machine shop turn.	29.00 to 30.00
Mixed bor. & turn.	29.00 to 30.00
Cl'n cast. chem. bor.	34.00 to 35.00
No. 1 machinery cast.	60.00
No. 2 machinery cast.	60.00
Heavy breakable cast.	55.00 to 60.00
Stove plate	50.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	$35.50
No. 2 hvy. melting	35.50
No. 1 bundles	35.50
New busheling	35.50
Flashings	35.50
Mach. shop turn.	$30.00 to 30.50
Shoveling turn.	31.00 to 31.50
Cast iron borings	31.00 to 31.50
Mixed bor. & turn.	31.00 to 31.50
Low phos. plate	39.50 to 40.50
No. 1 cupola cast	60.00 to 63.00
Heavy breakable cast.	52.00 to 56.00
Stove plate	52.00 to 56.00
Automotive cast	60.00 to 63.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	39.00 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	35.50 to 36.50
Mixed bor. & turn.	34.50 to 35.50
Clean cast chemical bor.	40.00 to 42.00
No. 1 machinery cast.	63.00 to 65.00
No. 1 mixed yard cast.	61.00 to 63.00
Hvy. breakable cast.	56.00 to 57.00
Clean auto cast.	61.00 to 63.00
Hvy. axle forge turn.	41.00 to 42.00
Low phos. plate	47.00 to 48.00
Low phos. punchings	47.00 to 48.00
Low phos. bundles	46.00 to 47.00
RR. steel wheels	51.00 to 52.00
RR. coil springs	51.00 to 52.00
RR. malleable	70.00 to 75.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.50 to 38.50
Bundled sheets	37.50 to 38.50
Mach. shop turn.	33.00 to 33.50
Locomotive tires, uncut	48.00 to 49.00
Mis. std sec rails	51.00 to 52.00
Rerolling rails	52.00 to 53.00
Steel angle bars	57.00 to 58.00
Rails 3 ft and under	59.00 to 60.00
RR. steel springs	50.00 to 51.00
Steel car axles	52.00 to 53.00
Grate bars	56.00 to 57.00
Brake shoes	54.00 to 55.00
Malleable	71.00 to 72.00
Cast iron car wheels	54.00 to 55.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	54.00 to 55.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	37.50 to 38.50
No. 2 bundles	37.50 to 38.50
No. 1 busheling	37.50 to 38.50
Long turnings	25.00 to 26.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Bar crops and plate	38.00 to 38.50
Structural and plate	38.00 to 38.50
No. 1 cupola cast.	60.00 to 65.00
Stove plate	55.00 to 58.00
No. 1 RR. hvy. melt.	37.50 to 38.50
Steel axles	38.00 to 39.00
Scrap rails	44.00 to 45.00
Rerolling rails	52.00 to 54.00
Angles & splice bars	47.50 to 50.00
Rails 3 ft. & under	52.00 to 56.00
Cast iron carwheels	48.00 to 50.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$40.00 to $40.50
No. 2 hvy. melting	40.00 to 40.50
Mach. shop turn.	35.00 to 35.50
Short shov. turn.	37.00 to 37.50
Cast iron borings	36.00 to 36.50
Low phos.	45.00 to 45.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.50
No. 2 hvy. melting	34.50
No. 2 bundles	34.50
Comp. galv. bundles	$32.00 to 33.00
Mach. shop turn.	30.00 to 31.00
Mixed bor. & turn.	30.00 to 31.00
Shoveling turn.	30.00 to 31.00
No. 1 cupola cast	57.00 to 60.00
Clean auto cast	57.00 to 60.00
Hvy. breakable cast	54.00 to 55.00
Charging box cast.	54.00 to 55.00
Stove plate	50.00 to 51.00
Unstrp. motor blks.	49.00 to 50.00
Cl'n chem. cast bor.	33.50 to 34.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$44.00 to $46.00
No. 2 hvy. melting	39.75
No. 1 bundles	39.75
No. 2 bundles	39.75
No. 1 busheling	39.75
Mach. shop turn.	34.75 to 37.00
Shoveling turn.	36.75 to 39.00
Cast iron borings	36.75
Mixed bor. & turn.	34.75
Mixed cupola cast.	60.00 to 62.50
Charging box cast.	54.00 to 56.00
Stove plate	58.00 to 60.00
Clean auto cast.	62.00 to 65.00
RR. malleable	70.00 to 75.00
Small indl. malleable	47.00 to 49.00
Low phos. plate	48.00 to 50.00
Scrap rails	58.00 to 59.00
Rails 3 ft & under	60.00 to 61.00
RR. steel wheels	52.00 to 53.00
Cast iron carwheels	52.00 to 53.00
RR. coil & leaf spgs.	52.00 to 53.00
RR. knuckles & coup.	52.00 to 53.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$39.50 to $40.00
No. 2 hvy. melting	39.50 to 40.00
No. 1 bundles	39.50 to 40.00
No. 1 busheling	39.50 to 40.00
Drop forge flashings	39.50 to 40.00
Mach. shop turn.	34.50 to 35.00
Shoveling turn.	36.50 to 37.00
Steel axle turn.	39.50 to 40.00
Cast iron borings	35.50 to 36.00
Mixed bor. & turn.	35.50 to 36.00
Low phos.	44.50 to 45.00
No. 1 machinery cast.	60.00 to 65.00
Malleable	70.00 to 72.00
RR. cast.	63.00 to 65.00
Railroad grate bars	57.50 to 58.00
Stove plate	57.50 to 58.00
RR. hvy. melting	40.00 to 40.50
Rails 3 ft & under	57.00 to 61.00
Rails 18 in. & under	57.00 to 61.00

SAN FRANCISCO

Per gross ton f.o.b. shipping point:

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	25.00
No. 2 bales	25.00

Per gross ton delivered to consumer:

No. 3 bales	$19.50
Mach. shop turn.	16.00
Elec. furn. 1 ft und.	$32.00 to 34.00
No. 1 cupola cast.	32.00 to 33.00
RR. hvy. melting	26.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$25.50
No. 2 hvy. melting	25.50
No. 1 bales	25.50
No. 2 bales	25.50
No. 3 bales	19.50
Mach. shop turn.	17.50
No. 1 cupola cast.	$36.00 to 40.00
RR. hvy. melting	26.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	$26.50
Elec. furn. 1 ft and und.	$27.50 to 30.00
No. 1 cupola cast.	30.00 to 40.00
RR. hvy. melting	27.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point.

Heavy melting	$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact, prep'd	21.00*
Bushelings, new fact, unprep'd	16.00*
Short steel turnings	17.00*
No. 1 cast	$42.00 to 43.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	Feb. 10, 1948	Feb. 3, 1948	Jan. 13, 1948	Feb. 11, 1947
Hot-rolled sheets	2.80	2.80	2.80	2.50
Cold-rolled sheets	3.55	3.55	3.55	3.20
Galvanized sheets (10 ga.)	3.95	3.95	3.95	3.55
Hot-rolled strip	2.80	2.80	2.80	2.50
Cold-rolled strip	3.55	3.55	3.55	3.20
Plates	2.95	2.95	2.95	2.65
Plates wrought iron	6.85	6.85	6.85	5.95
Stain's c-r strip (No. 302)	30.50	30.50	30.50	30.50
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$6.80	$6.80	$6.80	$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90
Bars and Shapes: (cents per pound)				
Merchant bars	2.90	2.90	2.90	2.60
Cold-finished bars	3.55	3.55	3.55	3.20
Alloy bars	3.30	3.30	3.30	3.05
Structural shapes	2.80	2.80	2.80	2.50
Stainless bars (No. 302)	26.00	26.00	26.00	26.00
Wrought iron bars	7.15	7.15	7.15	6.15
Wire and Wire Products: (cents per pound)				
Bright wire	3.55	3.55	3.55	3.30
Wire nails	4.75	4.75	4.25	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.75	$2.75	$2.75	$2.50
Light rails	3.10	3.10	3.10	2.85
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$45.00	$45.00	$45.00	$42.00
Slabs, rerolling	45.00	45.00	45.00	42.00
Forging Billets	55.00	55.00	55.00	50.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	61.00
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.80	2.80	2.80	2.55
Skelp	2.60	2.60	2.60	2.35

Pig Iron: (per gross ton)	Feb. 10, 1948	Feb. 3, 1948	Jan. 13, 1948	Feb. 11, 1947
No. 2, foundry, Phila.	$44.61	$44.61	$44.61	$32.51
No. 2, Valley furnace	39.50	39.50	39.50	30.50
No. 2, Southern Cin'ti	43.28	43.28	43.28	31.75
No. 2, Birmingham	37.38	37.38	37.38	26.88
No. 2, foundry, Chicago†	39.00	39.00	39.00	30.50
Basic del'd Philadelphia	44.11	44.11	44.11	33.67
Basic, Valley furnace	39.00	39.00	39.00	30.00
Malleable, Chicago†	39.50	39.50	38.50	30.50
Malleable, Valley	39.50	39.50	39.50	30.50
Charcoal, Chicago	62.46	62.46	62.46	42.99
Ferromanganese‡	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$40.50	$40.50	$40.50	$35.50
Heavy melt'g steel, Phila.	*41.50*	42.50	41.50	33.50
Heavy melt'g steel, Ch'go	39.50	39.50	39.75	32.25
No. 1, hy. comp. sheet, Det.	35.50	35.50	35.25	28.50
Low phos. Young'n	47.75	47.75	47.75	37.25
No. 1, cast, Pittsburgh	57.75	57.75	55.00	42.50
No. 1, cast, Philadelphia	59.00	59.00	58.00	46.00
No. 1, cast, Chicago	67.50	67.50	69.50	44.25
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$12.50	$12.50	$12.50	**$8.75**
Foundry coke, prompt	14.00	14.00	14.00	**8.50**
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro. Conn.	21.50	21.50	21.50	19.75
Copper, Lake Conn.	21.625	21.625	21.625	**19.625**
Tin, Grade A, New York	94.00	94.00	94.00	70.00
Zinc, East St. Louis	12.00	12.00	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	12.80
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	36.56	36.56	36.56	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.25

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 10, 1948	3.18925¢ per lb.	$40.17 per gross ton	*$40.50* per gross ton
One week ago	3.18925¢ per lb.	$40.17 per gross ton	$40.83 per gross ton
One month ago	3.18925¢ per lb.	$40.08 per gross ton	$40.58 per gross ton
One year ago	2.87255¢ per lb.	$30.15 per gross ton	$33.75 per gross ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1948	3.18925¢ Jan. 13		$40.17 Jan. 29	$39.58 Jan. 6	$41.83 Jan. 20	$40.00 Jan. 6
1947	3.18925¢ Aug. 12	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) For merchant trade. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb & over. (9) Carload lot in manufacturing trade. (10) Delivered Los Angeles only. (11) Hollowware enameling, gages 29 to 31 only. (12) Produced to dimensional tolerances in AISI Manual Sec. 6. (13) Delivered San Francisco only. (14) Kaiser Co. prices (15) to 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Delivered Los Angeles; add ½¢ per 100 lb for San Francisco. (17) Slab prices subject to negotiation in most cases. Some producers charge (18) $2 more. (19) $1 more. (20) $6 more per ton.

Basing Points	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio		San Franc'co. Los Angeles, Seattle	DELIVERED TO Detroit	New York	Philadelphia
INGOTS															
Carbon, rerolling					($36.00 f. o. b. mill)		(Spot market as high as $86 to $90 gross ton)								
Carbon, forging	$46.00														
Alloy	$56.00									(Canton = $56.00)					
BILLETS, BLOOMS, SLABS															
Carbon, rerolling[17]	$45.00[18]	$45.00[18]	$45.00[18]	$47.00	$45.00[18]	$45.00[18]							$48.20[18]		
Carbon, forging billets	$55.00	$55.00	$55.00	$55.00	$55.00	$55.00							$58.20		
Alloy	$66.00	$66.00				$66.00	(Bethlehem, Massillon, Canton = $66.00)								
SHEET BARS								Subject to negotiation							
PIPE SKELP	2.60¢						2.60¢[20]								
WIRE RODS	2.80¢[19]	2.80¢[19]		2.80¢[19]	2.85¢		(Worcester = 2.90¢[19])					3.52¢[13]			
SHEETS															
Hot-rolled	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢	2.80¢		(Ashland, Ky. = 2.80¢)		3.54¢[16]	2.96¢	3.148¢	3.040¢
Cold-rolled[1]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢	3.55¢		3.65¢	3.55¢			3.71¢	4.00¢	4.016¢
Galvanized (10 gage)	3.95¢	3.95¢	3.95¢		3.95¢		3.95¢	3.95¢	4.05¢	3.95¢	(Ashland = 3.95¢)	4.62¢[16]		4.298¢	4.190¢
Enameling (12 gage)	3.95¢	3.95¢	3.95¢	3.95¢			3.95¢		4.05¢	3.95¢			4.11¢	4.466¢	4.408¢
Long ternes[2] (10 gage)	4.05¢		4.05¢											4.566¢	4.506¢
STRIP															
Hot-rolled[3]	2.80¢	2.80¢	2.80¢	2.80¢[15]	2.80¢		2.80¢					3.60¢[16]	2.96¢	3.316¢	3.258¢
Cold-rolled[4]	3.55¢	3.65¢	3.65¢	3.55¢			3.55¢			(Worcester = 3.75¢)			3.71¢	4.066¢	4.006¢
Cooperage stock	3.10¢	3.10¢			3.10¢		3.10¢							3.616¢	
TINPLATE															
Cokes, 1.50 lb[5], base box	$6.80	$6.80	$6.80		$6.90			$6.90	$6.90	(Warren, Ohio = $6.80)				$7.248	$7.140
Electro, box { 0.25 lb	Deduct $1.00 from 1.50 lb coke base box price.														
Electro, box { 0.50 lb	Deduct 80¢ from 1.50 lb coke base box price.														
Electro, box { 0.75 lb	Deduct 60¢ from 1.50 lb coke base box price.														
TERNES, MFG., special coated	Deduct 90¢ from 1.50 lb coke base box price.														
BLACKPLATE, CANMAKING															
55 lb to 70 lb	Deduct $1.60 from 1.50 lb coke base box.														
75 lb to 95 lb	Deduct $1.70 from 1.50 coke base box.														
100 lb to 128 lb	Deduct $1.60 lb from 1.50 lb coke base box.														
BLACKPLATE, h. o. 29 ga[11]	4.75¢	4.75¢	4.75¢		4.85¢			4.85¢	4.85¢					5.198¢	5.090¢
BARS															
Carbon steel	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢	2.90¢					3.625¢[16]	3.06¢	3.35¢	3.356¢
Rail steel[6]	Subject to negotiation because of fluctuating scrap prices.														
Reinforcing (billet)[7]	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢	2.75¢				3.325¢[16]		3.098¢	2.990¢
Reinforcing (rail)	Subject to negotiation because of fluctuating scrap prices.														
Cold-finished[8]	3.55¢	3.55¢	3.55¢	3.55¢		3.55¢							3.71¢	4.00¢	4.006¢
Alloy, hot-rolled	3.30¢	3.30¢	3.30¢			3.30¢	3.30¢	(Bethlehem, Massillon, Canton = 3.30¢)							3.432¢
Alloy, cold-drawn	4.10¢	4.10¢	4.10¢	4.10¢		4.10¢			(Canton = 4.10¢)						
PLATE								(Coatesville = 3.45¢, Claymont = 3.65¢, Geneva, Utah = 3.10¢)							
Carbon steel[12]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢		2.95¢	2.95¢				3.838¢[14]		3.298¢	3.190¢
Floor plates	4.20¢	4.20¢												4.716¢	4.656¢
Alloy	3.80¢	3.80¢	3.80¢		(Coatesville = 4.80¢)									4.316¢	4.256¢
SHAPES, Structural	2.80¢	2.80¢	2.80¢		2.80¢	2.80¢	(Geneva, Utah = 2.95¢, Bethlehem = 2.80¢)					3.43¢[10]		3.040¢	2.932¢
SPRING STEEL, C-R															
0.08 to 0.40 carbon	3.55¢			3.55¢			(Worcester = 3.75¢)								
0.41 to 0.60 carbon	5.05¢			5.05¢			(Worcester = 5.25¢)								
0.61 to 0.80 carbon	5.65¢			5.65¢			(Worcester = 5.85¢)								
0.81 to 1.05 carbon	7.15¢			7.15¢			(Worcester = 7.35¢)								
1.06 to 1.35 carbon	9.45¢			9.45¢			(Worcester = 9.65¢)								
MANUFACTURERS' WIRE[9]															
Bright	3.55¢	3.55¢		3.55¢	3.55¢		(Worcester = 3.65¢, Duluth = 3.60¢)					4.56¢[13]		4.022¢	4.006¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.60¢	4.60¢		4.60¢			(Worcester = 4.70¢, Duluth = 4.85¢) (Trenton = 4.85¢)					5.737¢[13]		5.072¢	4.964¢
PILING, Steel sheet	3.30¢	3.30¢				3.30¢								3.75¢	3.756¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	Subject to negotiation			Subject to negotiation		
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	Subject to negotiation			Subject to negotiation		
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt, Beth.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville, Beth, Brackenridge	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet, Beth, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton, Brackenridge, Balt, Coatesville	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt, Brackenridge	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	38.00
Strip, c-r, P'gh, Cleve, Jersey City, Reading, Canton, Youngstown, Balt, W. Leechburg	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila, Ft. Wayne, Brackenridge	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton, W. Leechburg	32.46	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	28.75
Tubing, seamless, P'gh, Chi, Canton, Brackenridge, Milwaukee	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	82¢
18	4	1	—	5	$1.29
18	4	2	—	—	93¢
1.5	4	1.5	8	—	59¢
6	4	2	6	—	63¢

High-carbon-chromium*	47¢
Oil hardening manganese*	26¢
Special carbon*	24¢
Extra carbon*	20¢
Regular carbon*	17¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.50¢
Armature	4.80¢
Electrical	5.30¢
Motor	6.05¢
Dynamo	6.75¢
Transformer 72	7.25¢
Transformer 65	7.95¢
Transformer 58	8.65¢
Transformer 52	9.45¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., per 100 lb	$2.75
Angle splice bars, 100 lb	3.85
(F.o.b. basing points)	*per 100 lb*
Light rails (from billets)	$3.10

	Base per lb
Cut spikes	4.85¢
Screw spikes	6.90¢
Tie plate, steel	3.65¢
Tie plates, Pittsburg, Calif.	3.80¢
Track bolts	7.00¢
Track bolts, heat treated, to railroads	7.25¢

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, St. Louis, Kansas City, Minnequa, Colo.; Birmingham; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa.; Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$7.05	$14.10

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	21.50	....
Inconel-clad		
10 pct, f.o.b. Coatesville	30.00	....
Monel-clad		
10 pct, f.o.b. Coatesville	24.00	....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Birmingham

	Base per keg	Column San Francisco
Standard & coated nails*	94	115
Galvanized nails*	94	115
Woven wire fence†	100	123
Fence posts, carloads††	105	...
Single loop bale ties	99	123
Galvanized barbed wire**	113	133
Twisted barbless wire	113	...

* Also Duluth; Worcester, 6 columns higher. † 15½ gage and heavier. ** On 80-rod spools, in carloads. †† Pittsburgh, Duluth only.

	Base per 100 lb	San Francisco
Annealed fence wire ‡	$4.20	$5.21
Annealed, galv. fencing ‡	4.65	5.66
Cut nails, carloads ‡‡	6.30	...

‡ Add 10¢ at Worcester. ‡‡ Pittsburgh only, less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Sheets									
Hot-rolled	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
Cold-rolled	5.30	5.30	5.30		5.30	5.30	5.30	5.30	5.30
Galvanized	....	6.00	..	...	....	6.00	....	....	....
Strip									
Hot-rolled	4.30	4.30	4.30	....	4.30	4.30	4.30	4.30	4.30
Cold-rolled	....	....	5.30	....	....	5.30	5.30	5.30	5.30†
Shapes	....	4.30	....	....	4.30	4.30	4.30	4.30	....
Beams	....	4.30	....	....	....	4.30	....	....	....
Bars									
Hot-rolled	4.45	4.45	4.45	....	....	4.45	4.45	4.45	4.45
Bar shapes	....	4.45	....	....	4.45	4.45	4.45	4.45	....

† Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only
Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	*Black*	*Galv.*
⅛-in.	50½	34½
¼-in.	53½	38½
1-in.	56	41½
1¼-in.	56½	42
1½-in.	57	42½
2 in.	57½	43
2½ and 3-in.	58	43½
Wrought Iron, buttweld		
⅛-in.	+ 7	+29
¼-in.	2½	+19
1 and 1¼-in.	8	+11
1½-in.	13½	+ 7½
2-in.	14	+ 7
Steel, lapweld		
2-in.	49	34
2½ and 3-in.	52	37
3½ to 6-in.	54	39
Steel, seamless		
2-in.	48	33
2½ and 3-in.	51	36
3½ to 6-in.	53	38
Wrought Iron, lapweld		
2-in.	5½	+14½
2½ to 3½-in.	8	+10½
4-in.	12	+ 5
4½ to 8-in.	10	+ 6½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	49½	35
¼-in.	53½	39
1-in.	55½	42
1¼-in.	56	42½
1½-in.	56½	43
2-in.	57	43½
2½ and 3-in.	57½	44
Wrought Iron, buttweld		
⅛-in.	+ 2½	+23
¼-in.	3½	+17
1 to 2-in.	13	+ 7
Steel, lapweld		
2-in.	48	34
2½ and 3-in.	52	38
3½ to 6-in.	55½	41½
Steel, seamless		
2-in.	47	33
2½ and 3-in.	51	37
3½ and 6-in.	54½	40½
Wrought Iron, lapweld		
2-in.	8½	+11
2½ to 4-in.	17½	+ ½
4½ to 6-in.	13	+ 5

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

OD in in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$16.67	$19.99	$16.17	$19.39
2½	12	22.42	26.87	21.75	26.06
3	12	24.93	29.90	24.18	29.00
3½	11	31.17	37.39	30.23	36.27
4	10	38.69	46.38	37.53	44.99

CAST IRON WATER PIPE

Per net ton

6-in. to 24-in. del'd Chicago $91.12
6-in. to 24-in. del'd New York 89.18
6-in. to 24-in., Birmingham 79.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less 105.90
Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

Percent Off List

½ in. & smaller x 6 in. & shorter... 45
9/16 & ⅝ in. x 6 in. & shorter..... 46
¾ in. & larger x 6 in. & shorter..... 43
All diam, longer than 6 in. 41
Lag, all diam over 6 in. long..... 44
Lag, all diam x 6 in. & shorter..... 46
Plow bolts 54

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller 43
9/16 to 1 in. inclusive 42
1⅛ to 1½ in. inclusive 40
1⅝ in. and larger 35

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts	USS	SAE
7/16 in. and smaller	..	46
½ in. and smaller	44	..
½ in. through 1 in.	..	44
9/16 in. through 1 in. ...	43	..
1⅛ in. through 1½ in. ..	41	42
1⅝ in. and larger	35	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

Packages, nuts separate .....65 and 10
In bulk 75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets (½ *in. and larger*)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.65
F.o.b. Lebanon, Pa. 5.80

Small Rivets (7/16 *in. and smaller*)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 55

Cap and Set Screws

(In packages)	*Percent Off List*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	53
¾ to 1 in. x 6 in., SAE 1035, heat treated	44
Set screws, oval points	56
Milled studs	29
Flat head cap screws, listed sizes...	16
Fillister head cap, listed sizes	37

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$35.00
65% but less than 70%	34.00
60% but less than 65%.....	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer $5.95
Old range, nonbessemer 5.80
Mesabi, bessemer 5.70
Mesabi, nonbessemer 5.55
High phosphorus 5.55
Prices quoted retroactive to Jan. 1, 1947.

METAL POWDER

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh .....24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh .....30⅝¢ to 34½¢
Copper, reduced, 150 and 200 mesh .....30½¢ to 32¢
Iron, commercial, 100, 200, 325 mesh 96 + % Fe carlots...10¢ to 17¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags..7.4¢ to 8.5¢
Domestic sponge iron, minus 48 mesh ..... 10¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots ..... 5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots .....63¢ to 80¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe... 44¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe..... 39¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe .....90¢ to $1.75
Aluminum, 100, 200 mesh, carlots .....23¢ to 29¢
Antimony, 100 mesh ..... 44¢
Cadmium, 100 mesh $2.00
Chromium, 100 mesh and finer.. $1.025
Lead, 100, 200 & 300 mesh 20½¢ to 25½¢
Manganese, minus 325 mesh and coarser ..... 59¢
Nickel, 100 mesh ..... 51½¢
Silicon, 100 mesh ..... 29¢
Solder powder, 100 mesh..8½¢ plus metal
Stainless steel, 302, minus 100 mesh 75¢
Tin, 100 mesh ..... 90¢
Tungsten metal powder, 98%-99%, any quantity, per lb..... $3.05
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.. $2.65
Under 100 lb $2.90

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net Ton $12.00 to $13.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	13.50 to 14.50
Foundry, Byproduct	
Chicago, del'd	$18.60
Chicago, f.o.b.	17.50
New England, del'd	19.75
Seaboard, Kearney, N. J., f.o.b.	17.85
Philadelphia, f.o.b.	17.75
Swedeland, Pa., f.o.b.	17.75
Buffalo, del'd	20.15
Ashland, Ohio, f.o.b.	15.50
Painesville, Ohio, f.o.b.	16.60
Erie, del'd	19.95
Cleveland, del'd	17.90
Cincinnati, del'd	18.59
St. Louis, del'd	18.03
Birmingham, del'd	15.76

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	*Carloads, Per 1000*
No. 1 Ohio	$67.00
First quality, Pa., Md., Ky., Mo., Ohio	73.00
First quality, New Jersey	78.00
Sec. quality, Pa., Md., Ky., Mo., Ohio	67.00
Sec. quality, New Jersey	70.00
No. 2 Ohio	59.00
Ground fire clay, net ton, bulk	10.50
Silica Brick	
Pennsylvania and Birmingham	$73.00
Chicago District and Alabama	82.00
Silica cement, net ton (Eastern)	12.50
East Chicago	13.50
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$64.00
Magnesite Brick	
Standard, Balt. and Chester	$86.00
Chemically bonded, Baltimore	75.00
Grain Magnesite *std. ⅜-in. grains*	
Domestic, f.o.b. Balt. and Chester in bulk, fines removed	$51.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	27.00
in sacks with fines	31.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk. Midwest, add 10¢; Missouri Valley, add 20¢.	$11.05

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.51	$5.78	$5.91	$4.83	$5.73	$4.86	$4.57	$4.88	$5.58	$8.52	$8.67	$10.13	$10.28
New York	4.76	5.78[1]	6.16	5.09	6.07	5.11	4.78	5.08	5.63	8.58	8.73	10.18	10.33
Boston	....	....	....	....	....	....	....	....	....	....	....	....	....
Baltimore	4.33	....	5.73	4.81	....	4.78	4.73	4.86	5.56	....	....	....	....
Norfolk	4.90	....	....	5.30	....	5.15	5.15	5.20	6.00	....	....	....	....
Chicago	4.25	5.10	5.65	4.35	5.45	4.60	4.40	4.40	5.10	8.20	8.35	9.50	9.65
Milwaukee	4.458	5.308	5.858	4.458	5.658	4.808	4.608	4.608	5.308	8.58	8.708	9.858	10.008
Cleveland	4.25	5.10[1]	5.81	4.55	....	4.60†	4.68	4.40	5.10	8.51	8.66	9.50	9.65
Buffalo	4.25	5.10	6.05	5.25	5.70[5]	5.00	4.40‡	4.40‡	5.10	8.20	8.35	9.50	9.65
Detroit	4.57	5.42	6.07	4.77	5.67	4.92	4.82	4.50	5.22	8.69	8.84	9.97	10.12
Cincinnati	4.55	5.21	5.76	4.79	5.74	4.99	4.84	4.79	5.49	8.73	8.88	10.04	10.19
St. Louis	4.61	5.46	6.07	4.71	5.87	4.96	4.76	4.76	5.52	8.77	8.92	10.07	10.22
Pittsburgh	4.25	5.10[1]	5.65	4.35	....	4.60	4.40	4.40	5.10	8.20	8.37	9.50	9.65
St. Paul	4.68	5.53	6.08	4.78	....	5.03	4.83	4.83	6.00	....	....	....	....
Omaha	5.262	....	6.712	5.362	....	5.612	5.412	5.412	6.112	....	....	....	....
Indianapolis	4.59	5.36	5.91	4.69	5.79	4.94	....	4.74	5.44	....	....	....	....
Birmingham	4.45[11]	....	5.65	4.45[11]	....	....	....	....	6.13	....	....	....	....
Memphis	4.88[11]	5.94[1]	6.43	5.08[11]	....	5.23[11]	5.03[11]	5.03[11]	5.94	....	....	....	....
New Orleans	*5.05[11]	6.39[1]	....	5.25[11]	....	5.40[11]	*5.10[11]	*5.20[11]	6.39[6]	....	....	....	....
Houston	5.75[9]	....	7.36	6.00[9]	....	5.85[9]	5.85[9]	5.35[17]	7.00	9.40	9.25	10.40	10.55
Los Angeles	5.75	7.35[1]	7.40	6.05	8.70[5]	5.55	5.35	5.50	7.35[14]	9.70[15]	9.55[10]	11.15[15]	11.30[15]
San Francisco	5.40[8]	6.65	7.05	5.75[8]	8.70	5.50	5.20	5.05	7.50	9.70[15]	9.55[15]	11.15[15]	11.30[15]
Seattle	5.45[4]	7.25[2]	6.85	5.60[4]	....	5.60[4]	5.25[4]	5.45[4]	7.45[14]	....	8.95[16]	....	11.30[15]
Portland	5.30[4]	7.10[2]	6.70	5.60[4]	....	5.45[4]	5.25[4]	5.55[4]	7.45[14]	....	....	....	....
Salt Lake City	6.40	....	7.85	6.70	....	6.20	6.35	6.55	7.55	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 399 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

* Add 46¢ for sizes not rolled in Birmingham

† Over ¾ in. thick and 90 in. wide.

‡ Add 40¢ for sizes not rolled at Buffalo.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

BASING POINT* PRICES						DELIVERED PRICES† (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	40.00	40.50	41.00	41.50	.....	Boston	Everett	$0.50 Arb.	.....	45.50	46.00	.....	.....
Birmingham	38.88	38.38-39.38	.....	.....	.....	Boston	Steelton	5.78	45.78				51.78
						Brooklyn	Bethlehem	3.60	43.60	44.10	44.60	45.10	.....
Buffalo	40.00-42.50*	40.00-43.00*	40.50 43.50*	.....	.....	Cincinnati	Birmingham	5.85	44.73	42.23-45.23	.....	.....	.....
Chicago	38.50	39.00	39.50	40.00	.....	Jersey City	Bethlehem	2.21	42.21	42.71	43.21	43.71	.....
Cleveland	38.50-39.75*	39.00-40.25*	39.50-40.75*	.....	.....	Los Angeles	Provo	7.13	46.13	46.63	.....	.....	.....
						Mansfield	Cleveland-Toledo	2.56	41.06-42.31*	41.56-42.81*	42.06 43.31*	42.56	.....
Duluth	39.00	39.50	40.00	40.50	.....								
Erie	38.50	39.00	39.50	40.00	.....	Philadelphia	Bethlehem	2.00	42.00	42.50	43.00	43.50	.....
Everett		45.00	45.50	.....	.....	Philadelphia	Swedeland	1.21	43.21	43.71	47.21	47.71	
Granite City	39.50	40.00	40.50	.....	.....	Philadelphia	Steelton	2.59	42.59	.....	.....	.....	48.59
Neville Island	39.00	39.50	39.50	40.00	.....	San Francisco	Provo	7.13	46.13	46.63	.....	.....	.....
Provo	39.00	39.50	.....	.....	.....	Seattle	Provo	7.13	46.13	46.63	.....	.....	.....
Sharpsville	39.00	39.50	39.50	40.00	.....	St. Louis	Granite City	0.75 Arb.	40.25	40.75	41.25	.....	.....
Steelton	40.00	.....	.....	.....	46.00								
Struthers, Ohio	39.50	.....	.....	.....	.....								
Swedeland	45.00	45.50	46.00	46.50	.....								
Toledo	38.50	39.00	39.50	40.00	.....								
Troy, N. Y.	.....	.....	.....	.....	46.00								
Youngstown	39.00	39.50	39.50	40.00	.....								

* Republic Steel Corp. price. **Basis: Average price of No. 1 hvy. mlt. steel scrap at Cleveland or Buffalo respectively as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.**

Basing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$49.50; f.o.b. Buffalo—$50.75. Add $1.25 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $55.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $62.46. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$145
Less ton lots (packed)	189.00
Delivered Pittsburgh	151.00

$1.80 for each 1% above 82% Mn; penalty, $1.80 for each 1% below 78%.

Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	8.70	8.95	9.50
Ton lots	10.30	10.90	12.80
Less ton lots	11.20	11.80	13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$46.00	$47.00
F.o.b. Pittsburgh	50.00	51.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	32
L.c.l. lots	34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.07% max. C. 0.06% P, 90% Mn.	23.00	24.85	26.05
0.10% max. C.	22.50	24.35	25.55
0.15% max. C.	22.00	23.85	25.05
0.30% max. C.	21.50	23.35	24.55
0.50% max. C.	21.00	22.85	24.05
0.75% max. C., 7.00% max. Si.	18.00	19.85	21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload bulk	7.80
Ton lots	9.45
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	8.75
Ton lots	10.35
Less ton lots	11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, openhearth $78.00, foundry, $79.00; $78.75 f.o.b. Niagara Falls; $77.50 f.o.b. Jackson, Ohio. Electric furnace silvery iron is not being produced at Jackson. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe..	16.90	17.50	18.10
97% Si, 1% Fe..	17.30	17.90	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	5.25	5.50	5.70
Ton lots	6.85	7.45	7.75
Less ton lots	7.75	8.35	8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	15.50	....	....
50% Si	9.30	9.80	10.00
75% Si	11.80	12.10	12.85
85% Si	13.30	13.60	14.35
90% Si	15.00	15.30	16.00

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	26.50	26.90	27.00
0.10% C	26.00	26.40	26.50
0.15% C	25.50	25.90	26.00
0.20% C	25.25	25.65	25.75
0.50% C	25.00	25.40	25.50
1.00% C	24.50	24.90	24.75
2.00% C	24.25	24.65	24.75
65-69% Cr, 4.9% C	18.60	19.00	19.15
62-66% Cr. 4-6% C. 6-9% Si.	18.60	19.00	19.15

Briquets — Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	12.50	12.75	12.85
Ton lots	14.00	14.90	15.50
Less ton lots	14.90	15.80	16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	19.70	20.10	20.25
Ton lots	21.85	23.15	23.95
Less ton lots	23.35	24.65	25.45

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% mn, 1.25% max. C.

	Eastern	Central	Western
Carload	25.00	25.40	25.50
Ton lots	27.30	27.95	29.15
Less ton lots	29.10	29.75	30.95

Chromium Metal

Contract prices, cents per lb, chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.

	Eastern	Central	Western
0.20% max. C.	97.00	98.50	99.75
0.50% max. C.	93.00	94.50	95.75
9.00% min. C.	91.50	93.00	94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe r 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	16.25	16.75	18.80
Ton lots	19.35	20.10	22.25
Less ton lots	20.85	21.60	23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	17.50	18.00	20.05
Ton lots	19.80	20.65	22.40
Less ton lots	20.80	21.65	23.40

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.85	$2.70	$3.40
Less ton lots	2.20	3.05	4.20

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-500% C.

	Eastern	Central	Western
Ton lots	18.00	19.10	21.05
Less ton lots	19.25	20.35	22.30

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	15.75	16.85	18.80
Less ton lots	17.00	18.10	20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed	$2.35
Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2	$1.30
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb	
Ton lots	$2.50
Less ton lots	$2.55
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo.	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo.	80¢
Molybdenum oxide in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo.	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	$1.11
Less ton lots	$1.16
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	$1.16
Less ton lots	$1.40
High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton	$142.50
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton	$65.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Carload lots	18.40¢
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	
Carload, bulk	6.00¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	6.90¢
Ton lots	7.40¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Car lots	9.50¢
Ton lots	10.25¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

Eastern	Central	Western
$1.20	$1.23	$1.21

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.044

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$1.80	$1.8125	$1.8445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.	
Carload lots	39.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b., Suspension Bridge, N. Y., freight allowed, Ti 15-17%, B 0.90-1.15%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.0¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3%-4%, Si 40%-45%, per lb contained B	$6.35

NEWS OF INDUSTRY

Dr. Joseph Slepian Receives Edison Medal

Pittsburgh

• • • **Dr. Joseph Slepian,** associate director of the Westinghouse Research Laboratories, was awarded the Edison Medal of 1947 at the winter convention of the American Institute of Electrical Engineers in Pittsburgh. He was honored for his outstanding contributions to lightning protection, high-voltage circuit breakers, and other electrical apparatus.

Formal presentation of the award was made by Blake D. Hull, president of the American Institute of Electrical Engineers. Dr. Slepian is the 37th recipient of the annual award founded in 1909 to honor Thomas A. Edison. Past winners include Alexander Graham Bell, Nikola Tesla, and George Westinghouse.

The scientist's achievements were described to the meeting by Marvin W. Smith, Westinghouse vice president in charge of engineering. Mr. Smith said that three major barriers blocked the progress of electric power systems in the 1920's and 1930's—the need for a new method of protection against lightning strokes, circuit breakers to handle the enormous potential short circuits of growing power systems, and an economical device for converting great amounts of alternating current into direct current.

Dr. Slepian broke through these barriers with his invention of radically new lightning arresters, circuit breakers, and the famed mercury-arc rectifier, the Ignitron.

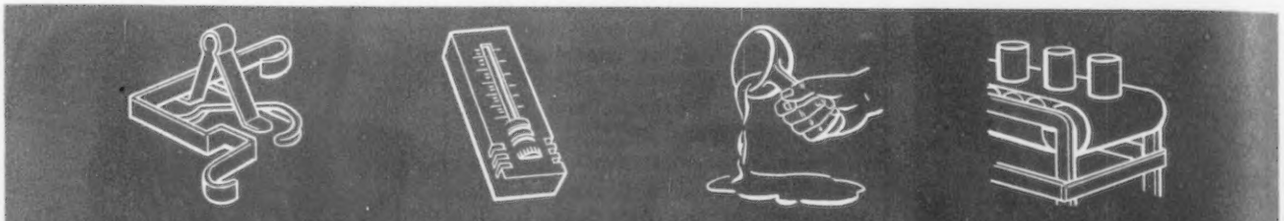
Founders Elect Chairman

Cleveland

• • • **Henry J. Trenkamp,** president, Ohio Foundry Co., Cleveland, and a director and treasurer, Gray Iron Founders' Society, was elected chairman of the Northern Ohio group of Gray Iron Founders' Society at the organizational meeting of that body.

James B. Heisler, vice-president, A. C. Williams Co., Ravenna, Ohio, also a director of the society, was elected vice-chairman of the newly organized group. F. J. Dost, vice-president, Sterling Foundry Co., Wellington, Ohio, was named secretary-treasurer.

8 Ways Reeves Speed Control Increases Production–Improves Quality

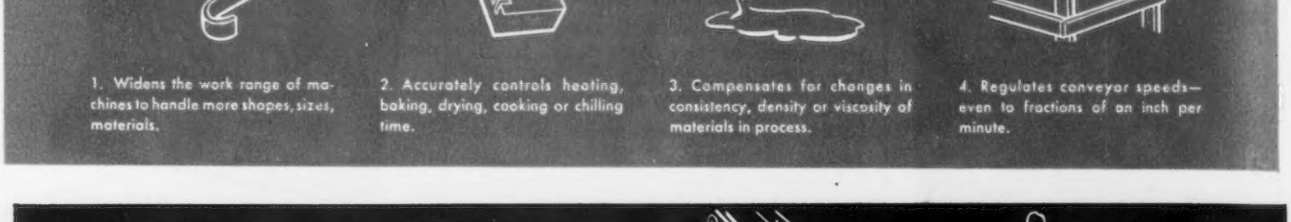


1. Widens the work range of machines to handle more shapes, sizes, materials.

2. Accurately controls heating, baking, drying, cooking or chilling time.

3. Compensates for changes in consistency, density or viscosity of materials in process.

4. Regulates conveyor speeds—even to fractions of an inch per minute.



5. Maintains uniform peripheral speed (or tension) on decreasing or increasing diameters.

6. Maintains uniformity of pressure, weight, liquid level, temperature and other variable elements.

7. Synchronizes parts of one machine or machines operating in series.

8. Matches variances in number or skill of operators.

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REEVES Speed Control is standard equipment on more than 2,100 different makes of machines and is easily applied to your existing machines. Units are available in the widest variety of types, sizes, capacities and speed ratios with manual, push button or automatic control.

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VARIABLE SPEED TRANSMISSION for providing infinite, accurate speed flexibility over a wide range—2:1 to 16:1. Sizes—fractional to 87 hp.

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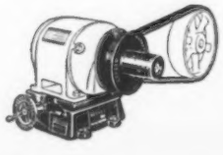

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